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ORIGINAL COMMUNICATIONS.

ART. I. *Suggestions relative to the best Models of Style to be adopted in designing the new Houses of Parliament in the Gothic Taste.* By HENRY NOEL HUMPHREYS.

THE persevering and careful research which has been devoted, of late years, to the study of that style of architecture conventionally termed Gothic, has produced a degree of excellence hitherto little expected in the imitation of its beautiful details, and even in some of its higher attributes; and has inoculated the British architectural world with a mania, not only for restoring the old, but also for erecting new, buildings in that style, but little anticipated by its admirers of twenty years ago. When the first brightness of the novelty and fashion consequent upon the introduction of the modern Roman, or rather Italian, style began to wear off, a few original minds, capable of looking in a different direction to the crowd, turned back, and perceived the forgotten beauties of the Gothic, which it had so completely superseded.

In the height of the Italian mania, even Inigo Jones, with all his genius, was so much enslaved by its influence, as to build a Roman portico to the Gothic St. Paul's. But a century later, when the tyranny of the fashion was in some degree abated, a man of inferior genius, Sir C. Wren, designed the towers of Westminster Abbey in a style more in accordance with that of the building to which they were to be appended; thus making an actual attempt at Gothic. This was *le premier pas:* other restorations were attempted, with a praiseworthy attention to the style with which they were to amalgamate; with, however, it must be confessed, most lamentable success.

Then came Horace Walpole's open and declared admiration of the discarded style of our noble cathedral and collegiate architecture, which gave a new impulse to the revived appreciation of the Gothic; and many efforts were made in that style more successful than his own fanciful and ridiculous attempts at Strawberry Hill: for he was no architect. He admired the Gothic rather with the eye of a poet. He saw and felt the picturesque, and occasionally even magnificent and sublime

results; but had no idea of the practical means by which they were arrived at. Yet the impetus had been given; and the style, though confined almost entirely to a few additions to, or alterations of, old buildings, went on improving. The next era in the rise of the modern Gothic is, perhaps, the time of Wyatt and his school, who received immense sums for restorations and additions to our cathedral and collegiate buildings, carried on upon a scale as yet unprecedented.

Still, however, there was no proper feeling of the true spirit of Gothic architecture; but, since that period, many men of elegant genius and unwearying industry, in answer to the calls of an already prevailing taste, have devoted their whole energies to the cultivation of this style; and some of our finest cathedrals have been restored to their original state with a perfection and accuracy that need not shun the scrutiny of their great Gothic masons themselves, if their shades ever walk in the dim light of those lofty ailes. Here, perhaps, having restored, and thus preserved, to the admiration of yet distant generations, those beautiful historic monuments of our nation, the practice of Gothic architecture ought to have stopped. The *resuscitated* Gothic can only be successful when the most accurate and almost servile imitation is adhered to; and the practice of art, in such a spirit, seems ill in accordance with the progressive genius of our most enlightened age. An age which the system of general education, though yet in its infancy, has filled with a thirst for knowledge and advance, and the means of acquiring them, unequalled at any period of which we have record, seems to call for that *originality* which must be the result of a proper adaption of our new and varied knowledge to the new and varied wants of our more elevated position. Are we, then, to be copyists in one of the most noble arts of civilisation, architecture? But a discussion upon the means of *originating* a style in accordance and on a level with the taste, science, and feeling of the age, would lead me far from my subject. Fashion has been beforehand with me; and, as I have said in the first few lines of this paper, the careful study and successful practice of the Gothic in restoration has led to its adoption in new buildings. Churches and theatres, gin-shops and dissenting chapels, gentlemen's seats and peasants' cottages, are springing up in every direction in this style, studied, in many instances (in all successful ones), with the antiquarian and curious accuracy of an archæologist. Such being the case, I suppose I must go with the stream as far as it goes, so long as it is too strong for me; for the government takes the lead in the state barge, pulling away with bold and lusty strokes, having determined to build the greatest building in the country, the seat of legislature of this great empire, in the Gothic style. Admitting the improbability of stemming the torrent, we may yet take

measures for securing the best part of the stream; and, in such an attempt, I venture the ensuing remarks. It being decided that the building was to be Gothic (or Elizabethan), there was an open competition for the glory, as well as profit, of becoming its architect. The prize, with reference to the competion merely of the competing designs, has been most justly awarded: so far, all is well. Now comes the consideration whether, even by the best, the capabilities and different applications of the Gothic have been, as yet, sufficiently studied and mastered, to enable them to undertake, with the *greatest possible effect* of which the style is capable, the erection of so great and novel a work as the new Houses of Parliament.

Most of our architects who have attained to any celebrity in the Gothic have, no doubt, thoroughly studied all the fine monuments of the style which this country possesses; and, among our cathedrals, abbeys, colleges, and castles, there is doubtless a fine field for study, and a rich harvest to reap: yet none of these examples display the capabilities of the Gothic, in its application to the purely civic purpose of a *senate house*.

We have, it is true, in the last phase of pure Gothic art, the Tudor style, as it has been termed, *private residences;* but these do not possess the dignity requisite in a public building, and yet display beauties so peculiar and distinct, as to exemplify most completely the facility with which the Gothic artists adapted their architecture to any new and specific purpose.

With the accession of the first of the Tudor family, ceased the disastrous contention of York and Lancaster; and other simultaneous causes tended to settle that public security, which, for the first time, became sufficiently felt to induce wealthy individuals to descend from their castles and strongholds, and erect open and elegant mansions in the plains; and here, again, as in all former instances, the *adaptability* of the style was as beautifully exemplified, as the endless invention and ingenuity of its professors were incontestably proved. Thus we see that the Gothic, in what may be termed its *natural existence*, suited itself with wonderful pliability to every new purpose to which it was applied; producing, at the same time, in each fresh application, a peculiarity of feature and feeling which strongly and characteristically marked the individual, without, as it were, destroying the harmony of the family likeness.

This we may easily picture to ourselves by imagining a group. Let there be a castle, with its machicolated gateway, upon an eminence; the abbey, with all its distinctive features, upon a rich slope of green, at a bend of the river; the mansion, for which the castle above seems to have been deserted, just glancing from a grove of noble elms, with its bay windows and quaint porch; and, above the half-leveled walls of the adjacent town, the noble

towers of the pinnacled cathedral, and the square mass of the collegiate or school buildings. Here we have the various members of the Gothic family of this country. How harmoniously they group! and yet how distinctly the well-defined features of each individual at once proclaim its different constitution and peculiar purpose! It will be seen, moreover, that this family group does not present a model for a senate house, or structure of similar character; and yet, had one of those architects who so wonderfully adapted their system to any new purpose upon which they were called to exercise it, been required to execute such a building, it is quite clear, from the examples before us, that he would not only have succeeded admirably, but have imparted to the novel work a stamp and character peculiar to itself. He would, in short, have furnished us with the model required.

Such would have been the result during the *natural existence* of the art; but, in the reign of what may be termed its *resuscitation*, how different! The present existence of the Gothic is but a galvanic species of being, a sort of muscular motion, independent of, and deprived of, the vital principle. The vivifying spirit has departed; the power of shooting forth new members in endless variety and combination, and yet, as it were, with the same parent sap thrilling in every fibre, exists no more. Without a model of precisely similar character, the Gothic cannot *now* be successfully practised. For example, let us imagine a modern professor of the art attempting to build a Gothic cathedral, with only a Gothic castle before him as a model; or let him attempt the construction of a Tudor mansion, even with the combined advantages of the cathedral and castle before him as types of his intended structure; and let any person acquainted with the subject paint the result upon the canvass of imagination, and he will laugh at the bare idea. Hence it appears, that, if we persist in being Gothic architects, we must, to stand any chance of success, become, to a certain extent, copyists; and copyists not only of the broad principles, but even more particularly of the individual features, in which the true and ductile graces of the style are developed. In fact, I believe it will readily be admitted, that the Gothic, except as a style of careful imitation, could not now exist. This, indeed, is sufficiently proved by a reference to the works of such architects as have adopted some of its principles as a groundwork, or stock upon which to engraft their own fanciful and frequently unmeaning inventions; the mean, the unpleasant, the barbarous, I had almost said disgusting, effect of which combination must be apparent to even an ignorant observer, capable of the least natural perception of the beautiful and symmetrical.

Having endeavoured to establish the necessity of a model of precisely similar character, in order to erect a building in this

taste with the *greatest possible* effect of which the art is capable, I come to this point: Whence did Mr. Barry derive the model for his design for the Houses of Parliament? That it was the best, by far the best, nay, in my humble opinion, the only tolerable one, in the competition, is no answer; that he has designed and erected other buildings in the style, of almost faultless perfection, is no answer. For the most successful of these he had models, and knew how to use them, of precisely similar character. The Gothic family of England, it has been seen, did not present a model of the application of the style to a purpose similar to the one in question; and Mr. Barry, without looking farther, has endeavoured to supply the deficiency by the substitution of a mixture of the cathedral and collegiate manners (if I may be allowed the use of such distinctive terms), and has produced an imposing design; and, considering the insurmountable difficulties which must ever encounter a modern *Goth* in the pursuit of such a course, a clever adaption. But is it the true spirit in which one of the great Gothic masons themselves would have conceived and modeled such a structure? With all diffidence, but strong conviction, I reply, certainly not. Before I directly indicate the *true model* for such a building, I would endeavour to point out a number of faults almost inevitably consequent upon the system pursued; but space prevents my entering much into detail upon this part of the subject, and I shall only advert to two. In the first place, I cannot but think that no Gothic architect, in what I have termed the *natural growth* of the art, would have designed a building of such importance with the daring disregard of symmetry which characterises Mr. Barry's work. In the present instance, I confine the term "symmetry" to the meaning of a general uniformity in corresponding parts. A *façade* conceived upon this principle should never have the appearance of terminating at one extremity with a colossal tower, and at the other with a slender steeple.* The great Gothic artist always preserved the balance and general uniformity of the masses of corresponding portions of a building, however he allowed his exuberant fancy to run wild in detail. In fact, uniformity of corresponding parts was as essential in Gothic, as in Grecian, Egyptian, or any other perfect style of architecture. Our modern students of the Gothic have been too apt to look at the picturesque masses of our cathedral and collegiate buildings, with all their additions by

* This effect is produced in the river *façade*, though complete in itself, by not placing the great tower in the centre of the building, whilst the clock-tower, and a corresponding object, should have occupied each extremity. These objects, it is true, belong to the other front, which the peculiarity of the scite renders of necessity irregular; but they might, at all events, have been made to minister to the effect of the river front, where the most perfect symmetry was within the reach of the architect.

various hands at various periods, as though they were perfect works. They are anything rather than complete or perfect works; and any Gothic artist of repute, of any period, would have deemed himself disgraced by designing such an irregular mass as the very finest of them, picturesque as they are; and, if we refer to such *original designs* as are still in existence of some of the finest Gothic buildings of Europe, we shall find this axiom fully illustrated, with but few and trifling exceptions. And yet it will be found, upon referring to a great number of the plans proposed for the Houses of Parliament, that the designers have carefully copied the irregular grouping of our ecclesiastical buildings, which have served them as models*; so difficult is it, when we become copyists, to avoid the deformities of our model. We sink, to borrow a simile from a sister art, into the materialism of the Flemish school, where we should catch the idealism of the Italian. A great sculptor, when he makes a statue, seeks to produce what nature *intended;* what the model *should* have been, rather than what it is. So should our Gothic student endeavour to imagine what the original planner and creator of one of these noble piles would have made could he have lived (which has been but rarely the case) to complete his projected work; instead of copying the deformities, if I may use so strong a term for the irregularities which time, change of taste, and a thousand such accidents, have accumulated.†

The other point I would urge against Mr. Barry's design is, the introduction of buttresses between the windows, along the whole line of the river front. I would either have made my walls of sufficient strength to do without them, or have so concealed them by suitable decoration as to have rendered them, if possible, ornamental. A great authority, M. Merrimée, director of the historic monuments of France, has denounced the buttress as the most unsightly expedient of the Gothic architect. They give to the finest building the appearance of a tottering and propped ruin; particularly where the flying buttress is resorted to, which always produces, to use his own words, *l'effet d'une ruine chancelante.* But they had great objects to attain by means of this device: the immense height of their interiors (the great secret of their wonderful effect) produced, in conjunction with the high roof, so great a thrust upon the outer walls, as to render some such contrivance absolutely necessary, unless they had made walls of an extraordinary, and almost impossible, thickness; whilst, by their scientific application of this

* It is but justice to observe that Mr. Barry's design was by far the *most* regular among the principal designs.

† A careful study of such *original designs* as are still preserved cannot be too strongly recommended.

principle, it is wonderful what they effected, with walls of a lightness almost incredible. Nevertheless, when they had not the inconveniences of great height, without any cross ties to counteract the thrust of the roof, to contend with, they rarely resorted to the unsightly buttress: it was the great object alluded to that led to its adoption; and it was essentially an adjunct of church architecture, where they sacrificed every thing to the aerial sublimity of their interiors. It is, however, well known that custom caused it sometimes to be adopted, as well in that class of buildings, as in others, where it was not always absolutely necessary. But, in their great civic buildings, where the exterior walls were no longer a shell constrained to support the weight and thrust of an enormous roof at a great altitude, they at once dispensed with the *prop;* and the *façades* of their beautiful *hôtels de ville* were undisfigured by the unsightly buttress.

So much for the two blemishes which I have ventured to point out in Mr. Barry's design; namely, want of symmetry, or uniformity in the corresponding parts; and the unnecessary and profuse introduction of the buttress. It will at once be seen that my only object in all this is, to prove that, without a model in buildings of precisely similar character, the modern Gothic architect *must* fail to produce the *true* effects of the style; and that, to a certain extent, even Mr. Barry himself has done so.

Among his studies, he found no model, either in mass or detail, precisely suited to his purpose; and he proceeded at once without looking for one, to supply the deficiency by such combinations as his own genius of adaption suggested. Such treatment of the Gothic is like writing original poetry in a dead language; the effect of which is but too well known: for who would compare for a moment even the all-perfect Latinity of Trissino with the lay of the meanest Norman bard who sang in his mother tongue?

No! in adapting to modern use a dead language, or a dead architecture, we must content ourselves with translations; and, in the present instance, the only difficulty appears to be, to find an original. I point at once to the noble *hôtels de ville* of Germany and the Low Countries. Here, from the purest source, we are at once furnished with models for such a building as the British Houses of Parliament. How these noble *senate houses* of the free towns of the Empire and the Low Countries escaped the attention of Mr. Barry and the other competitors, appears to me both inexplicable and extraordinary, particularly when we consider that the plans and elevations of many of the most beautiful of them were within the reach of every architect, in various works at that time before the public.

These splendid senate houses, I cannot but reiterate, offer the true models of the application of the Gothic to such a purpose as the rebuilding of the Houses of Parliament. They present

original and distinguishing features, of such peculiar fitness to their purpose, as to render any modern attempts at creating a better adaption of the style to buildings of a similar class futile in the extreme. So, at least, it appears to me, and, I must think, to all who have studied, or even seen, any of the finest of these beautiful structures. To call attention to any in particular might only lead to cavil upon minor points, or I would make out a long list of such as, in beauty and unity of design, magnificence (I do not mean magnitude) of plan, characteristic beauty of detail, and, above all, in felicitous adaption of the style to the purpose, would leave far behind any of the plans in the late competition; and which would have required but little modification to suit them to the actual purpose in question. Not that I would have had an architect make a servile copy of any entire mass, but dexterously to seize the characteristic features both of general conception and detail.

Now, it is, perhaps, necessary for me to explain that I do not impute want of genius to any of the eminent men who illustrate the present school of architecture in this country; very far from it: I simply impute to them a want of tact in seizing the proper character to be given to the building which they were designing; and this was only to be obtained among the models alluded to, the natural models for such a structure as parliament houses in the Gothic style. This true character they sought to supply by studies among our cathedrals, abbeys, Tudor mansions, and Elizabethan seats; and were thus driven to an incompatible combination of styles, to meet a purpose the true model of which was before them, in all the completeness of a perfect growth and developement, if they would but have seized it. Even the genius of Barry, by neglecting the pure source, has failed to produce a pure work.

I have penned these observations in all modesty, however strongly I may occasionally, from complete conviction, have expressed myself. My only aim has been, if it is yet time, to call the attention of those who are competent to take advantage of them, to the characteristic beauties of the Gothic *senate houses* of Germany and Flanders, as the proper types of British houses of Parliament, if they *must* be erected in the Gothic style.

London, December, 1837.

ART. II. *The Poetry of Architecture.* By KATA PHUSIN.

No. 2. THE COTTAGE — continued.

III. *The Mountain Cottage. — Switzerland.*

IN the three instances of the lowland cottage which have been already considered, are included the chief peculiarities of

style which are interesting or important. I have not, it is true, spoken of the carved oaken gable and shadowy roof of the Norman village; of the black crossed rafters and fantastic projections which delight the eyes of the German; nor of the Moorish arches and confused galleries which mingle so magnificently with the inimitable fretwork of the grey temples of the Spaniard. But these are not peculiarities solely belonging to the cottage: they are found in buildings of a higher order, and seldom, unless where they are combined with other features. They are therefore rather to be considered, in future, as elements of street effect, than, now, as the peculiarities of independent buildings. My remarks on the Italian cottage might, indeed, be applied, were it not for the constant presence of Moorish feeling, to that of Spain. The architecture of the two nations is intimately connected: modified, in Italy, by the taste of the Roman; and, in Spain, by the fanciful creations of the Moor. When I am considering the fortress and the palace, I shall be compelled to devote a very large share of my attention to Spain; but, for characteristic examples of the cottage, I turn rather to Switzerland and England. Preparatory, therefore, to a few general remarks on modern ornamental cottages, it will be instructive to observe the peculiarities of two varieties of the mountain cottage, diametrically opposite to each other in most of their features; one always beautiful, and the other frequently so.

First, for Helvetia. Well do I remember the thrilling and exquisite moment when first, first in my life (which had not been over long), I encountered, in a calm and shadowy dingle, darkened with the thick spreading of tall pines, and voiceful with the singing of a rock-encumbered stream, and passing up towards the flank of a smooth green mountain, whose swarded summit shone in the summer snow like an emerald set in silver; when, I say, I first encountered in this calm defile of the Jura, the unobtrusive, yet beautiful, front of the Swiss cottage. I thought it the loveliest piece of architecture I had ever had the felicity of contemplating; yet it was nothing in itself, nothing but a few mossy fir trunks, loosely nailed together, with one or two grey stones on the roof: but its power was the power of association; its beauty, that of fitness and humility.

How different is this from what modern architects erect, when they attempt to produce what is, by courtesy, called a Swiss cottage. The modern building known in Britain by that name has very long chimneys (see *fig.* 12.), covered with various exceedingly ingenious devices for the convenient reception and hospitable entertainment of soot, supposed by the innocent and deluded proprietor to be "meant for ornament." Its gable roof slopes at an acute angle, and terminates in an

interesting and romantic manner, at each extremity, in a tooth-pick. Its walls are very precisely and prettily plastered; and it is rendered quite complete by the addition of two neat little bow windows, supported on neat little mahogany brackets, full of neat little squares of red and yellow glass. Its door is approached under a neat little veranda, "uncommon green," and is flanked on each side by a neat little round table, with all its legs of different lengths, and by a variety of neat little wooden chairs, all very peculiarly uncomfortable, and amazingly full of earwigs: the whole being surrounded by a garden full of flints, burnt bricks, and cinders, with some water in the middle, and a fountain in the middle of it, which wo'n't play; accompanied by some goldfish, which wo'n't swim; and by two or three ducks, which will splash. Now, I am excessively sorry to inform the members of any respectable English family, who are making themselves uncomfortable in one of these ingenious conceptions, under the idea that they are living in a Swiss cottage, that they labour under a melancholy deception; and shall now proceed to investigate the peculiarities of the real building.

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The life of a Swiss peasant is divided into two periods; that in which he is watching his cattle at their summer pasture on the high Alps *, and that in which he seeks shelter from the violence of the winter storms in the most retired parts of the low valleys. During the first period, he requires only occasional shelter from storms of excessive violence; during the latter, a sufficient protection from continued inclement weather. The Alpine or summer cottage, therefore, is a rude log hut, formed of unsquared pine trunks, notched into each other at the corners (see *fig.* 13.). The roof, being excessively flat, so as to offer no surface to the wind, is covered with fragments of any stone that will split easily, held on by crossing logs; which are, in their turn, kept down by masses of stone; the whole being generally sheltered behind some protecting rock, or resting against the slope of the mountain, so that, from one side, you may step upon the roof. This is the *châlet*. When well grouped, running along a slope of mountain side, these huts produce a very pleasing effect, being never obtrusive (owing to the prevailing greyness of their tone), uniting well with surrounding objects, and bestowing at once animation and character.

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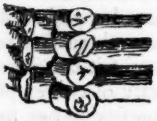

* I use the word Alp here, and in future, in its proper sense, of a high mountain pasture; not in its secondary sense, of a snowy peak.

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But the winter residence, the Swiss cottage, properly so called, is a much more elaborate piece of workmanship. The principal requisite is, of course, strength; and this is always observable in the large size of the timbers, and the ingenious manner in which they are joined, so as to support and relieve each other, when any of them are severely tried. The roof is always very flat, generally meeting at an angle of 155°, and projecting from 5 ft. to 7 ft. over the cottage side, in order to prevent the windows from being thoroughly clogged up with snow. That this projection may not be crushed down by the enormous weight of snow which it must sometimes sustain, it is assisted by strong wooden supports (seen in *figs.* 14. and 15.), which sometimes extend half down the walls for the sake of strength, divide the side into regular compartments, and are rendered ornamental by grotesque carving. Every canton has its own window. That of Uri, with its diamond wood-work at the bottom, is, perhaps, one of the richest. (See *fig.* 15. in p. 63.) The galleries are generally rendered ornamental by a great deal of labour bestowed upon their wood-work. This is best executed

in the canton of Berne. The door is always 6 or 7 feet from the ground, and occasionally much more, that it may be accessible in snow; and it is reached by an oblique gallery, leading up to a horizontal one, as shown in *fig.* 14. The base of the cottage is formed of stone, generally whitewashed. The chimneys must have a chapter to themselves: they are splendid examples of utility combined with ornament.

Such are the chief characteristics of the Swiss cottage, separately considered. I must now take notice of its effect in scenery.

When one has been wandering for a whole morning through a valley of perfect silence, where every thing around, which is motionless, is colossal, and every thing which has motion resistless; where the strength and the glory of nature are principally developed in the very forces which feed upon her majesty; and where, in the midst of mightiness which seems imperishable, all that is indeed eternal is the influence of desolation; one is apt to be surprised, and by no means agreeably, to find, crouched behind some projecting rock, a piece of architecture which is neat in the extreme, though in the midst of wildness, weak in the midst of strength, contemptible in the midst of immensity. There is something offensive in its neatness: for the wood is almost always perfectly clean, and looks as if it had been just cut; it is consequently raw in its colour, and destitute of all variety of tone. This is especially disagreeable, when the eye has been previously accustomed to, and finds, every where around, the exquisite mingling of colour, and confused, though perpetually graceful, forms, by which the details of mountain scenery are peculiarly distinguished. Every fragment of rock is finished in its effect, tinted with thousands of pale lichens and fresh mosses; every pine trunk is warm with the life of various vegetation; every grassy bank glowing with mellowed colour, and waving with delicate leafage. How, then, can the contrast be otherwise than painful, between this perfect loveliness, and the dead, raw, lifeless surface of the deal boards of the cottage. Its weakness is pitiable; for, though there is always evidence of considerable strength on close examination, there is no *effect* of strength: the real thickness of the logs is concealed by the cutting and carving of their exposed surfaces; and even what is seen is felt to be so utterly contemptible, when opposed to the destructive forces which are in operation around, that the feelings are irritated at the imagined audacity of the inanimate object, with the self-conceit of its impotence; and, finally, the eye is offended at its want of size. It does not, as might be at first supposed, enhance the sublimity of surrounding scenery by its littleness, for it provokes no comparison; and there must be proportion between objects, or

they cannot be compared. If the Parthenon, or the Pyramid of Cheops, or St. Peter's, were placed in the same situation, the mind would first form a just estimate of the magnificence of the building, and then be trebly impressed with the size of the masses which overwhelmed it. The architecture would not lose, and the crags would gain, by the juxta-position; but the cottage, which must be felt to be a thing which the weakest stream of the Alps could toss down before it like a foam-globe, is offensively contemptible: it is like a child's toy let fall accidentally on the hill side; it does not unite with the scene; it is not content to sink into a quiet corner, and personify humility and peace; but it draws attention upon itself by its pretension to decoration, while its decorations themselves cannot bear examination, because they are useless, unmeaning, and incongruous.

So much for its faults; and I have had no mercy upon them, the rather, because I am always afraid of being biassed in its favour by my excessive love for its sweet nationality. Now for its beauties. Wherever it is found, it always suggests ideas of a gentle, pure, and pastoral life. One feels that the peasants whose hands carved the planks so neatly, and adorned their cottage so industriously, and still preserve it so perfectly, and so neatly, can be no dull, drunken, lazy boors; one feels, also, that it requires both firm resolution, and determined industry, to maintain so successful a struggle against "the crush of thunder, and the warring winds." Sweet ideas float over the imagination of such passages of peasant life as the gentle Walton so loved; of the full milkpail, and the mantling cream-bowl; of the evening dance, and the matin song; of the herdsmen on the Alps, of the maidens by the fountain; of all that is peculiarly and indisputably Swiss. For the cottage is beautifully national; there is nothing to be found the least like it in any other country. The moment a glimpse is caught of its projecting galleries, one knows that it is the land of Tell and Winkelried; and the traveller, feels that, were he indeed Swiss-born, and Alp-bred, a bit of that carved plank, meeting his eye in a foreign land, would be as effectual as a note of the *Ranz des Vaches* upon the ear. Again, when a number of these cottages are grouped together, they break upon each other's formality, and form a mass of fantastic projection, of carved window and overhanging roof, full of character, and picturesque in the extreme: an excellent example of this is the Bernese village of Unterseen. Again, when the ornament is not very elaborate, yet enough to preserve the character, and the cottage is old, and not very well kept (suppose in a Catholic canton), and a little rotten, the effect is beautiful: the timber becomes weather-stained, and of a fine warm brown, harmonising delight-

fully with the grey stones on the roof, and the dark green of surrounding pines. If it be fortunate enough to be situated in some quiet glen, out of sight of the gigantic features of the scene, and surrounded with cliffs to which it bears some proportion; and if it be partially concealed, not intruding on the eye, but well united with every thing around, it becomes altogether perfect; humble, beautiful, and interesting. Perhaps no cottage can then be found to equal it; and none can be more finished in effect, graceful in detail, and characteristic as a whole.

The ornaments employed in the decoration of the Swiss cottage do not demand much attention: they are usually formed in a most simple manner, by thin laths, which are carved into any fanciful form, or in which rows of holes are cut, generally diamond-shaped; and they are then nailed one above another, to give the carving depth. Pinnacles are never raised on the roof, though carved spikes are occasionally suspended from it at the angles. No ornamental work is ever employed to disguise the beams of the projecting part of the roof, nor does any run along its edges. The galleries, in the canton of Uri, are occasionally supported on arched beams, as shown in *fig.* 15., which have a very pleasing effect.

Of the adaptation of the building to climate and character, little can be said. When I called it "national," I meant only that it was quite *sui generis*, and, therefore, being only found in Switzerland, might be considered as a national building; though it has none of the mysterious connexion with the mind of its inhabitants which is evident in all really fine edifices. But there is a reason for this: Switzerland has no climate, properly speaking, but an assemblage of every climate, from Italy to the pole; the vine wild in its valleys, the ice eternal on its crags. The Swiss themselves are what we might have expected in persons dwelling in such a climate: they have no character. The sluggish nature of the air of the valleys has a malignant operation on the mind; and even the mountaineers, though generally shrewd and intellectual, have no perceptible nationality: they have no language, except a mixture of Italian and bad German; they have no peculiar turn of mind; they might be taken as easily for Germans as for Swiss. No correspondence, consequently, can exist between national architecture and national character, where the latter is not distinguishable. Generally speaking, then, the Swiss cottage cannot be said to be built in good taste; but it is occasionally picturesque, frequently pleasing, and, under a favourable concurrence of circumstances, beautiful. It is not, however, a thing to be imitated: it is always, when out of its own country, incongruous; it never harmonises with anything around it, and

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can therefore be employed only in mimicry of what does not exist, not in improvement of what does. I mean, that any one who has on his estate a dingle shaded with larches or pines, with a rapid stream, may manufacture a bit of Switzerland as a toy; but such imitations are always contemptible, and he cannot use the Swiss cottage in any other way. A modified form of it, however, as will be hereafter shown, may be employed with advantage. I hope, in my next paper, to derive more satisfaction from the contemplation of the mountain cottage of Westmoreland, than I have been able to obtain from that of the Swiss.

ART. III. *Notes on modern Architecture.* By AMICUS.

No. 3.

I TOOK a glance at the new building jutting out at the corner of Paternoster Row; but all idea of criticism was absorbed in the regret I felt, that so excellent an opportunity should have been lost for making a grand opening to St. Paul's and the new Post-

Office. Here, a line of buildings in continuation of St. Martin's le Grand, through Paternoster Row, to St. Paul's Churchyard, would have thrown open an area not to be equalled in any other part of the city; it would have also brought into one view two of the most extensive buildings: but, I fear, a niggardly economy has wholly frustrated this idea. In this spot might have been placed the equestrian statue of the Duke of Wellington; thus forming, altogether, one of the most interesting groups in London. In no situation can we obtain a good view of St. Paul's: although the best side of the building would not then have been presented to us, yet it was the only view that we have any chance of obtaining in the present time.

Who the parties interested in the improvements of London are I know not; but few of them, perhaps, possess opinions above the ordinary and commonplace interests of pounds, shillings, and pence; and all our improvements are intrusted to managers who have very little idea of sacrificing at the shrine of Taste. Can we talk of the noble spirit of the most enlightened city in the world, when all improvements of a liberal nature are tinctured with commercial feeling? But the time has passed, I fear, to remedy this great oversight; and such another opportunity may not occur for a length of time.

I have called the New Post-Office one of the largest buildings in the city: but it does not follow that it is the best architectural design; for, although it is generally praised, it is but a commonplace production. Ask why it is praised, and you get such indiscriminate replies as, "It is grand," "noble," "large," "fine;" all which terms just amount to nothing: it is large, and the great secret in these commendations consists in this particular. The portico is the best feature in the building; but it possesses no novelty, except that of being larger than those of the same family dotted all over this great metropolis. But, if I say much of this, I shall have all the profession upon me at once; for how many public buildings are there erected in London, nay, all over the country, that have not this same feature? It would be a good speculation for a builder to mould the Grecian porticoes, and sell them ready made: it would save much time and expense. But, setting aside all banter, I have no doubt we could count scores of porticoes copied from the same Grecian authority. We will now just look at the wings. Here is novelty without thought; and a portico without any means of getting under it, except through the windows. How much better the building would have been without these additions! They are of no use whatever, and only darken the rooms opposite to which they stand; and they certainly do not enhance the dignity of the centre, but rather divert the eye from it. But the greatest fault of these porticoes is their utter uselessness. Turning round the corner to

the south end of the building, you are struck with a totally different composition. Here, the regular forms of the Athenian architecture merge into circular arches and the general characteristics of the Italian school. Had the principal front of the building been of a mixed design, the harmony of the composition would have been preserved; but, if the main features of a building partake of a certain style of architecture, the same idea should be carried through the design. An angular view of this building will convince every one of the necessity of attending to this particular; for, when the side and end are viewed at the same time, the perspective range in the horizontal lines of the windows is abruptly terminated by curves; and thus the idea of unity is destroyed.

The small Doric columns, in place of balusters, in the south end, are, in my opinion, far from being in good taste, from their association in our minds with entirely different uses. Much might have been done by an original design, with very little thought: but, to place *petit* columns in this situation, is reducing them to meaner and less meaning offices than have hitherto been assigned them.

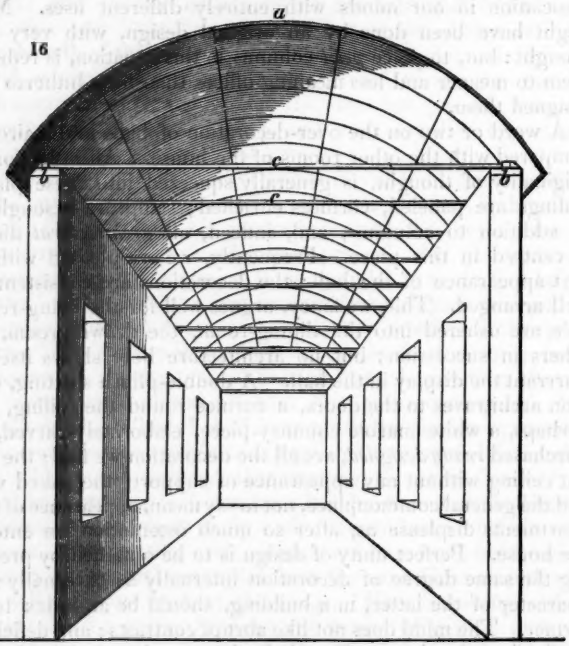
A word or two on the over-decoration of halls and staircases, compared with the other rooms of the house. All invention, all originality of thought, is generally squeezed into these places: ceilings are paneled, cornices enriched; sculpture is sought for in addition to columns; and, indeed, all *architectural* display is centred in this place. Frequently, we are pleased with the first appearance of the hall: the decorations are consistent and well arranged. This, we fancy, argues well for the living-rooms. We are ushered into the dining-room, the drawingroom, and others in succession; but no architecture here shows itself to warrrant the display in the hall. A double-plinth skirting, common architraves to the doors, a cornice round the ceiling, and, perhaps, a white marble chimney-piece, elaborately carved, and purchased *ready designed*, are all the decoration we find; the wide flat ceiling without any appearance of support, the naked walls, and the general commonplace, not to say mean, appearance of these apartments displease us, after so much ostentation on entering the house. Perfect unity of design is to be obtained by preserving the same degree of decoration internally as externally: the character of the latter, in a building, should be an index to the former. The mind does not like abrupt contrasts; and deficiency in finish only shows affected display on the outside for bad economy within. A house totally unfurnished should have a character of fulness, if I may so call it, that should not depend entirely upon the upholsterer for decoration.

ART. IV. *The Corrugated Cast-Iron Roof of the Coal Depot of the London Gas-Works, Vauxhall.* By M. D.

ON visiting the estates of the London Gas Company at Vauxhall, my attention was directed to one of the coal depots there, a building of considerable dimensions, the roof of which is constructed of corrugated cast-iron plates.

This appears to me to be one of the lightest, most elegant, and, from the particulars furnished on the spot, the most economical, description of roof which has yet been used for a public building; and, therefore, I doubt not but a short account of it, with a few sketches illustrative of the principles on which it is constructed, will be found interesting to some of your professional readers.

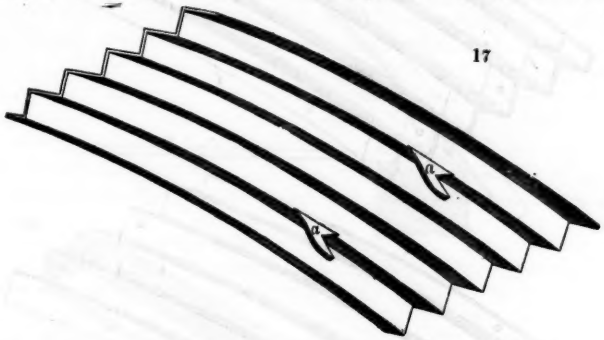
I believe that this is the only roof of the kind that has been erected, and, indeed, the first experiment which has been made



of throwing a corrugated cast-iron roof over an extensive space. It was erected at the suggestion of, and from drawings furnished by, Mr. Hutchison, the eminent engineer of the establishment, whose extensive improvements in gas machinery have rendered him so deservedly known to the public.

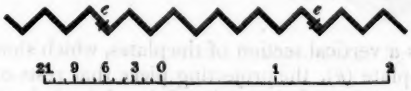
Fig. 16. exhibits a section and interior view of the depot, showing the roof (*a*), the wall-plates (*b b*), and the tie-rods (*c c*). The roof, which is the segment of a circle, is formed by a series of cast-iron plates, with parallel angular corrugations; five of the plates completing the arc.

Fig. 17. is an isometrical representation (viewed as an under surface) of one of the lower, or side, plates. Each of these is



cast with two small projections (*a a*), formed like the foot of a common rafter, which rests upon, and is secured to, an upright rib, raised on the centre of the wall-plate. The cast-iron plates measure 3 ft. 9 in. by 2 ft. 1 in.; and the sides of the corrugations are 3½ in.

Fig. 18. is a transverse section of the plates, showing the



manner in which they are joined at the sides, one overlapping the other, as at *e e*.

Figs. 19, 20. are isometrical representations of the upper plates, on the lower end of each of which there is a raised band (*f f*), 3 in. deep, that overlaps the end of the next plate, which is inserted underneath this projection; that is, the end *g* of *fig.* 19. fits on the end *h* of *fig.* 20. It will be observed that, on one side of each plate, the ledge is only 2 in. instead of 3½ in. because it is overlapped by the broader ledge of 3½ in. on the next plate. The side *i* of *fig.* 19. overlaps the side *k* of *fig.* 20., as shown at *e e*, *fig.* 18. The plates are secured together by small iron bolts, and are made perfectly air and water tight by filling the joints with cement or putty. A coating of tar or paint is occasionally applied, in order to protect the plates with more effect from the weather.

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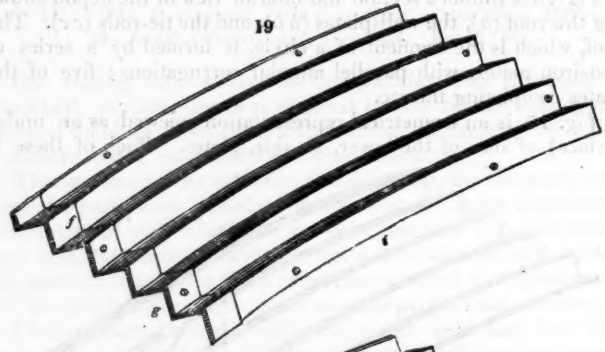

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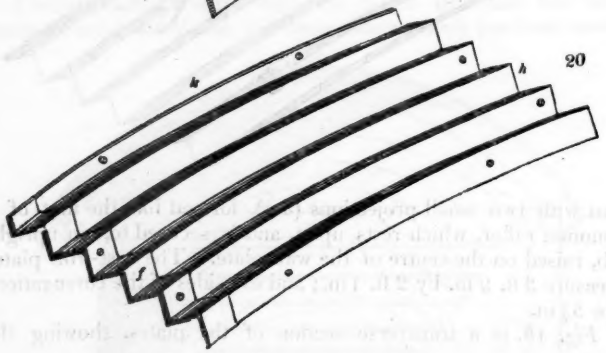


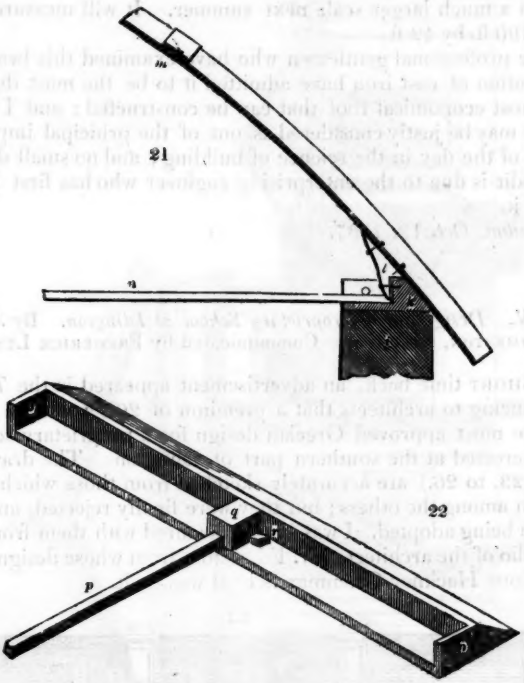
Fig. 21. is a vertical section of the plates, which shows the wall (*i*), the wall-plate (*k*), the projecting piece that rests on the wall-plate (*l*), the joining of the ends of the plates (*m*), and the tie-rod (*n*).

Fig. 22. is an isometrical representation of part of the wall-plate, which is worked into the stone or brick work on the top of the side walls. The wall-plates are in different lengths, joined by bolts at *o o*. They are kept in their proper position by tie-rods (*p*), each of which is inserted in a groove, or box (*q*), and there secured by the wedge, or key (*r*).

Each of the corrugations affords a channel for conveying the rain-water from the roof to the gutter, so that no accumulation of water can take place.

This description of roof seems to me to be well adapted to retort-houses and founderies, as it is not in any way injuriously affected by the great heat generated in those places.

It will be observed that there are neither rafters, king-bars, or lath required in this roof. It consists simply of cast-iron plates,



united by small bolts and tie-rods, as represented by the illustrative sketches.

I was informed, while examining this interesting roof, that the London Gas-Works had been visited, of late, by several eminent engineers and architects, for the purpose of seeing this improvement in the construction of roofs, and of ascertaining from Mr. Hutchison, the gentleman who built it, the practical advantages of adopting it in preference to wrought iron, slates, or tiles. I have ascertained that the average cost is 8*l.* per square yard; and, by way of illustrating the comparative expense of this and another kind of roof, I have had it from good authority, that the wrought-iron roofs of the retort-houses at Vauxhall cost each 2000*l.*; and similar buildings may now be roofed with corrugated cast iron at an expense of 800*l.* So marked a difference in the expense of constructing roofs must necessarily excite the attention of practical men, especially those who are engaged in buildings of any magnitude.

I am told that this roof has answered so well, and has given so much satisfaction, that it is Mr. Hutchison's intention to erect

one on a much larger scale next summer. It will measure, it is said, 190 ft. by 42 ft.

The professional gentlemen who have examined this beautiful application of cast iron have admitted it to be the most durable and most economical roof that can be constructed; and I think that it may be justly considered as one of the principal improvements of the day in the science of building; and no small degree of credit is due to the enterprising engineer who has first introduced it.

London, Oct. 12. 1837.

ART. V. *Design for a Proprietary School at Islington.* By JAMES EDMESTON, Architect. Communicated by FREDERICK LUSH.

A SHORT time back, an advertisement appeared in the *Times*, announcing to architects that a premium of *20l.* would be given for the most approved Grecian design for a proprietary school, to be erected at the southern part of Islington. The drawings (*figs.* 23. to 26.) are accurately sketched from those which were sent in among the others; but they were finally rejected, another design being adopted. I was kindly favoured with them from the portfolio of the architect, Mr. Edmeston, from whose designs and directions Hackney Grammar School was built.

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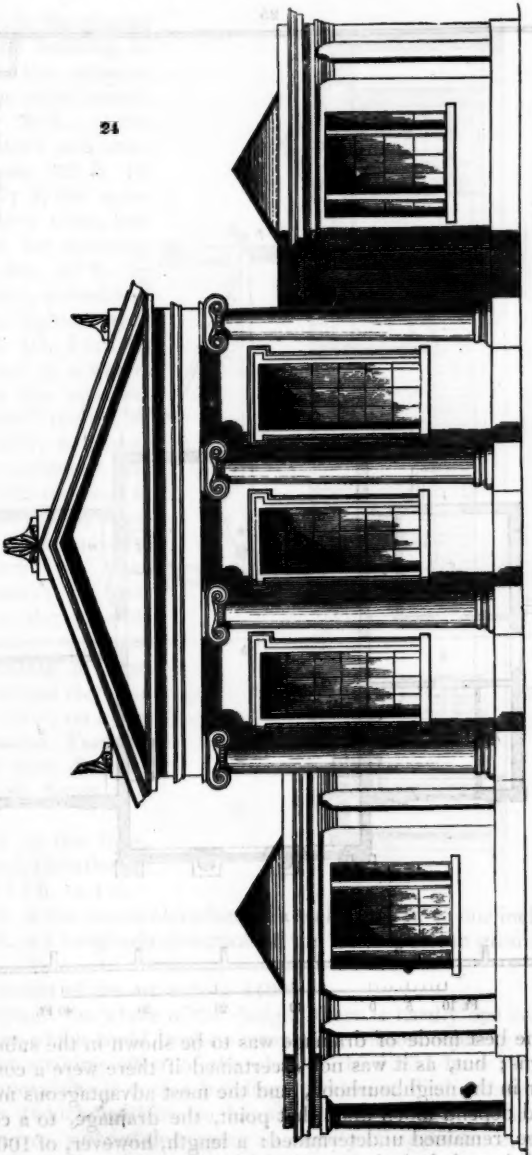
The present design for Islington School is made to accommodate 150 boys. The architect proposed to have the school-room warmed by two gas-stoves, which would produce an equable heat, be economical in their expense, and which would avoid the necessity of flues. The windows, being constructed for the upper sash to swing upon a pivot, would afford sufficient ventilation.



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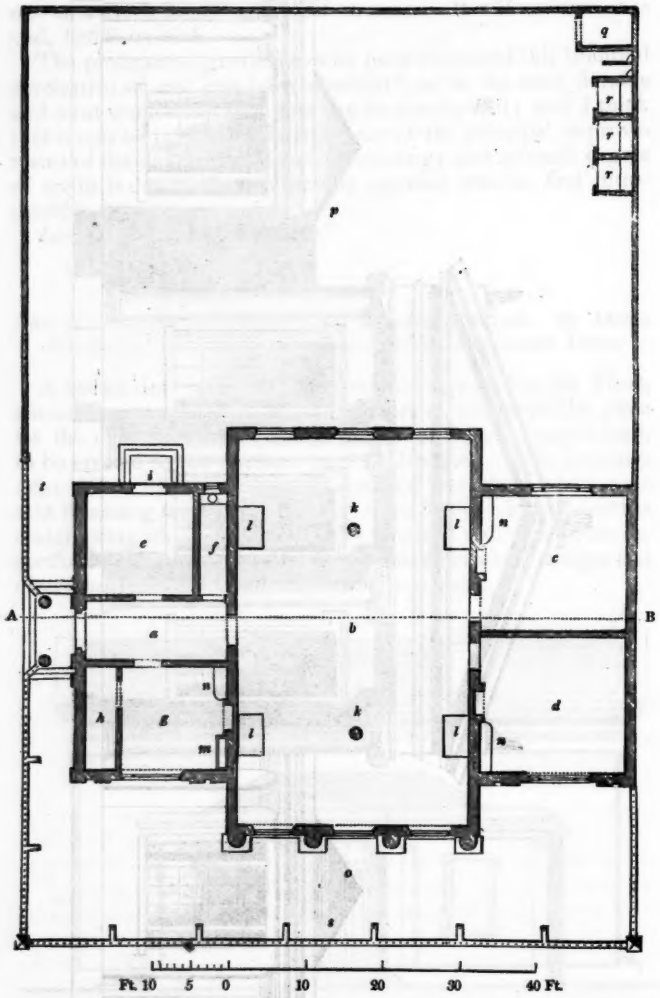

The best mode of drainage was to be shown in the submitted designs; but, as it was not ascertained if there were a common sewer in the neighbourhood, and the most advantageous method would depend much upon that point, the drainage, to a certain degree, remained undetermined: a length, however, of 100 ft. of 9-inch barrel drain is considered in the estimate.

Fig. 25. is the ground plan of the building, in which *a* is the entrance hall; *b*, the school-room, 50 ft. by 30 ft.; *c*, the head master's and committee-room, 19 ft. by 17 ft. 6 in.; *d*, the assistant master's room, and apartment for drawing, French, &c., 19 ft. by 17 ft. 6 in.; *e*, a cloak and hat room, lighted by a sash door (*i*), 14 ft. by 13 ft. 6 in.; *f*, a water-closet for the masters; *g*, the porter's room, 13ft. 6 in. by 13 ft.; *h*, a large closet for stationery, and other articles required in the school; *k k*, gas-stoves; *l l*, rostrums for the masters; *m*, sink; *n n*, closets; *o*, front garden; *p*, play-ground; *q*, coal-shed; *r r*, privies, &c.; *s*, railing in front of the principal elevation next the river, on a line with Duncan Terrace; *t*, railing next the road from High Street, Islington.

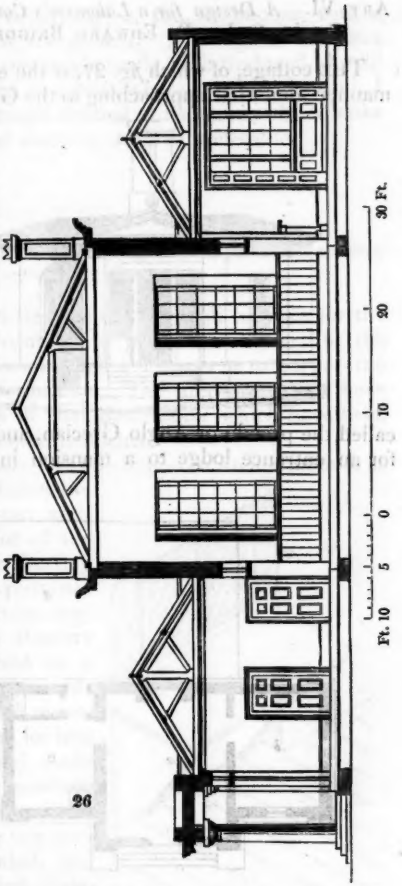

Fig. 24. is the front, or principal, elevation, at a scale of 11 ft. to 1 in.

Fig. 23. is the return elevation, at a scale of 16 ft. to one inch.

Fig. 26. is a longitudinal section on the line A B on the ground plan.

The amount of the estimate is 1420*l.*

Throughout the whole of the design, there is hardly one embellishment which could be done away with, without injuring the simple but striking effect of the whole. It would have been almost impossible, in such a building, to have studied economy and effect (which are here so happily blended together) in a greater degree, without destroying its dignity of appearance, or depriving it of all pretensions to architectural character.

Charles Square, London, March, 1836.

ART. VI. *A Design for a Labourer's Cottage or Gate Lodge, in the Grecian Style.* By EDWARD BRIGDEN, Architect, Bristol.

THE cottage, of which *fig.* 27. is the elevation, is designed in a manner somewhat approaching to the Grecian, or in what may be

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called the pseudo or Anglo Grecian, and would be very suitable for an entrance lodge to a mansion in the Grecian style. It

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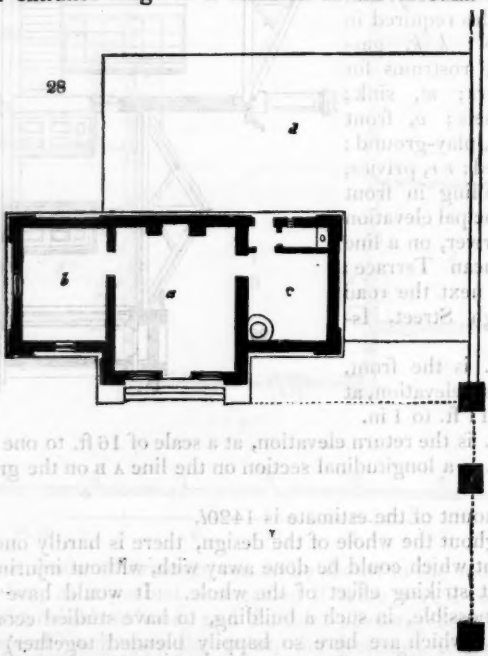

would look best faced with stone; and the gate pier should be of the same material. In *fig.* 28., which shows the ground plan, *a*

is the living-room; *b*, the bed-room; *c*, the washhouse, with a boiler in one corner; and *d*, the garden. Although no fireplace is shown in the bed-room, one might easily be introduced, should it be thought requisite. In countries where stone is plentiful, I have seen the floors of cottages formed of flagstone, which looks well; but, for comfort and warmth, wood is preferable.

Bristol, June, 1836.

ART. VII. *A temporary Table, or Ironing-Board, for small country Cottages.* By W. S.

IT is a matter of some little difficulty, in small cottages for the labouring classes in the country, to place the shutters to the windows on the ground floor in such a manner as to answer the purpose, and yet be out of the way. The following plan I have adopted in some buildings of that description which have been lately erected under my superintendence.

The shutters in *fig.* 29. are hung on hinges in such a manner as to fall down into a recess below the window during the daytime; and, consequently, are quite out of the way when not wanted for shutting up the house, or for the purposes hereafter described. The idea suggested itself to me, that shutters might be occasionally used as a temporary table or ironing-board; and, to effect this end, two moveable bars, as supports, were let into mortises in the floor, and made to abut against similar mortises made in the ledges on the under side of the shutters. The two cornices were slightly rounded, and the upper surface was left plain, without paint. Two swing iron or wood brackets might be used instead of the two wooden bars, as they could be folded back into the recess also.

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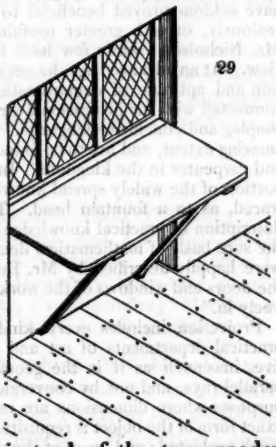

London, Oct. 1837.

REVIEWS.

ART. I. *A Treatise on Projection, &c.* By Peter Nicholson. 4to. Newcastle, 1836.

THE various works of Mr. Nicholson have acquired a celebrity which renders his name a guarantee of the value and importance of the present work. To every one who is acquainted with mechanical drawing, or who is interested in

mathematical pursuits, a mere glance at the volume will suffice to convince them how laborious but how excellent a work has been achieved, in the present instance, by the venerable and highly respected author. A descriptive title-page affords a general idea of the various objects comprehended in the volume, which are, to explain the first principles of plans and elevations, the modes of delineating solids and every form of mechanical construction, so as to present a striking image of the object to be carried into execution. The accomplishment of these is developed on entirely new principles, the nature and application of which will be best understood by a reference to the volume; but the principal feature is, that, by means of *a directing diagram*, every line of any required projection may be at once referred to its proper place by means of a parallel ruler. The application of this figure is not only novel and ingenious, but it exceedingly simplifies the whole process of projection, and renders easy of execution what cannot be accomplished by any other means. The volume also contains a complete system of Isometrical Drawing; and the whole is applied to Architecture, Building, Carpentry, Machinery, Ship-building, Astronomy, and Dialling. The nature of the subject requires, and has in this instance obtained, the aid of numerous illustrations, which are neatly engraved on sixty-seven copperplates, which furnish most admirable examples to the mechanical artist.

The utility of a work of this description is so evident as not to require comment. We wish, however, to direct the attention of the scientific reader to its eminent merits, and to notice the high claims which the talented author has upon the liberal patronage of the public. Scientific works, it is well known, have seldom proved beneficial to the writers; and few have laboured more zealously, or with greater usefulness, in this department of literature, than Mr. Nicholson; while few have been less benefited in a pecuniary point of view. At an advanced age, he yet retains that remarkable clearness of conception and aptitude of demonstration, which enable him to grasp every subject connected with his professional writings, and to develope his views in plain, simple, and conclusive language. Hence, his works have been popular to an amazing extent, and are to be found on the bookshelf of every intelligent mason and carpenter in the kingdom. Indeed, to Mr. Nicholson's writings, a large portion of the widely spread knowledge of architecture which prevails may be traced, as to a fountain head. They have had the effect of rendering this description of practical knowledge familiar, and, at the same, of placing it on the sure basis of mathematical demonstration; or, as Mr. Nicholson's labours were happily described by Mr. Buddle at a public meeting, "he threw open the doors and windows of the workshop to the light of science, and bade it flow freely in."

Projection includes every kind of representation which is used in the practical departments of art and science. It is distinguished from Perspective, inasmuch as it is the geometrical delineation of objects by means of parallel rays, and not by converging rays. Hence, it is adapted for all those purposes where dimensions are required, or where a true delineation of the exact form of the object is requisite. As a mode of drawing, it has hitherto been much neglected; and, even at the present time, is very imperfectly understood; of which nothing can afford a stronger proof than the various contradictory opinions which have from time to time appeared in several London publications. The present volume, however, establishes the theory on a firm basis, and exhibits it in so clear and attractive a form, that it will, doubtless, become one of the most esteemed standard works, and find a place in the library of every scientific and mechanical student. (*Newcastle Journal. Communicated to the Architectural Magazine by the Author of the Article.*)

ART. II. *Original Geometrical Illustrations; or the Book of Lines, Squares, Circles, Triangles, Polygons, &c.: showing an easy and scientific Analysis for increasing, decreasing, and altering any*

given Circle, Square, Triangle, Ellipsis, Parallelogram, Polygon, &c., to any other Figure containing the same Area, by plain and simple Methods, laid down agreeably to mathematical Demonstration, indispensable to Architects, Artists, Artificers, Builders, Cabinet-makers, Carpenters, Engineers (Military and Civil), Engravers, Glass-cutters, Jewellers, Machinists, Painters, Sculptors, Statuaries, &c.: containing, also, a Variety of useful Information, intended as a complete Instructor to the most useful Science of Geometry and Mensuration. By John Bennett, Engineer, Author of the "Artificer's complete Lexicon," "Labour Prices for Builders," &c. 4to, with numerous engravings on wood, and 55 copperplates. London, 1837.

THE title of this work so fully explains its contents, that we need say little more than that the body of the work fulfils the expectations raised by the title; and that it well deserves a place in the library of every working mechanic.

As the author informs us in his Preface, "the various geometrical figures are laid down with simplicity and perspicuity, suitable alike for the artisan, manufacturer, and gentleman; and, being principally drawn to the scale or size of the common two-feet rule, are thereby rendered plain to the understanding and easy of imitation."

The work consists of two parts: 1. "Geometrical Illustrations, mathematically demonstrated," which consist of a series of terms arranged alphabetically, explained verbally and by numerous woodcuts; and, 2., a series of copperplate engravings on 55 plates, with letterpress explanations.

ART. III. *A Letter to His Royal Highness the Duke of Sussex; with a Plan for the Promotion of Art, Science, and Literature, by the moderate but effectual Assistance of Government.* By Thomas L. Donaldson, Architect, Fellow and Honorary Secretary of the Royal Institute of British Architects, Corresponding Member of the Institute of France, &c. Pamph. 8vo. London, 1838.

THE ardour and enthusiasm with which Mr. Donaldson is engaged in the cause of architecture are well known; and, indeed, it is chiefly to his exertions that we are indebted for the establishment of the Institute of British Architects. We entirely agree with our correspondent, a Provincial Architect (see p. 1. of the present Volume), that the Institute of British Architects is constructed on a false foundation; and we expressed this opinion in detail, Vol. II. p. 470—472.; nevertheless, by directing public attention to the subject, and by other means, it has done much good; and, therefore, we think that it deserves that assistance from government which Mr. Donaldson suggests as desirable. After showing the very limited incomes of the Astronomical, Geographical, Asiatic, Statistical, and other Societies, as com-

pared with the good that they have done, and the large proportion of the expense which these and other Societies incur in the form of rent for apartments, Mr. Donaldson says,—

"I would therefore venture to suggest that government could afford assistance to such Associations, at once effectual and little liable to abuse, by locating them suitably; in fact, by extending to other Societies that privilege which is now peculiar to the Royal Society, Antiquarian, Geological, and Astronomical Societies, and the Royal Academy of Arts. By this means, their funds would be relieved from a material item of expense; and the fact of being in an edifice provided by government, and, as it were, carrying on their proceedings with its immediate sanction, would give them a weight and importance, which no other method could produce so effectually or so unobjectionably.

The details for carrying such an idea into execution will be found in the pamphlet itself; which, being dedicated to the Duke of Sussex, will, we trust, receive the attention of government.

ART. IV. *Blunt's Civil Engineer and Practical Machinist: Treatises on Civil Engineering, Engineer Building, Machinery, Mill-Work, Engine-Work, Iron-Founding, &c.; executed for the Use of Engineers, Iron-Masters, Manufacturers, and operative Mechanics.* By Charles John Blunt, Civil Engineer and Practical Machinist. Division B.

THE fifth number of this excellent work, designated as Division B., has at length made its appearance, nearly two years after the fourth, in which number the fifth was promised in six months.

Sincerely wishing well to this most useful and splendid undertaking, we cannot but lament that it should profess to be published periodically, and yet fail to keep time in any one number. This irregularity must have an injurious effect on the sale. Many valuable and interesting periodicals have failed from this cause alone. It is, therefore, well not to fix a time, except the power of keeping it be clearly ascertained.

It does not appear why the numerical designation has been superseded by the literal. We think there should have been a reason assigned for subjecting those readers who delight in chronological order, to the trouble of examining the dates on the engravings, as the only means afforded for settling the succession of the divisions.

But we have done with complaint; and we hope our intimations will be received in the same spirit of kindness which has dictated them. We feel much pleasure in adding to the favourable opinion already given of the work in Vol. I. p. 237., that the latter divisions are rendered much more interesting to the general reader, and more useful to the professional one, by the observations and specifications given in addition to the dry referential descriptions which alone constituted the letterpress of the early numbers.

Of the accuracy of the engravings, and clearness and abundance of the details, we cannot speak too highly. Mr. Blunt has done himself great honour by this exhibition of his skill and industry; and we hope he will be amply rewarded by an extensive sale. No engineer, iron-master, or manufacturer, ought to be without this inestimable work; and it would be an interesting addition to the library of every gentleman, more particularly such as delight in encouraging the advancement of practical science.

Although we cannot hope that any great proportion of the operative mechanics will avail themselves of the valuable information to be obtained from this publication, yet there are, no doubt, many whose prudential management of their moderate incomes affords a surplus sufficient for the purchase, who would thus outlay part of that surplus, were they informed of the existence of such a work.

The following outline of the contents of the five divisions already published will corroborate our encomiums.

No. I. Division 1.—*Boulton and Watt's Portable Steam-Engine, in twelve super-royal and folio plates.*

Plate 1. A general view of the entire engine. 2. The beam in detail, beam-carriage, gudgeons, &c. 3. The parallel motion. 4. The entire detail of the steam cylinder and piston. 5. The hot and cold-water pumps, in detail. 6. General plan of the engine. 7. The slide valves, and their casing. 8. The casing of the slide valve. 8. The eccentric rod and camb. 10. The governor in detail. 11. and 12. The engine framing.

No. II. Division 2. — *Marine Steam-Engines, Steam Corn-Mills, &c., complete in ten super-royal and folio plates.*

Plate 1. General plan of a pair of 40-horse marine engines. 2. A general transverse section of the two engines, the vessel, &c. 3. A general side elevation of the larboard engine. 4. A steam corn-mill. 5. Section of the steam corn-mill. 6, 7, 8, 9, 10. Details of the steam corn-mill.

No. III. Division 3. — *Horizontal and vertical Sugar-Mills, Forges, Mill and Forge Hammers, &c., complete in ten super-royal and folio plates.*

Plate 1. Horizontal and vertical sugar-mills. 2. A steam corn-mill, by Maudslay. 3, 4, 5. Details of the same. 6, 7, 8. The Kent and Surrey sewers, Duffield sluice. 9. The great tilt, or mill and forge, hammers. 10. Charles Manby's smith's forge, in use in the iron-works of Beaufort, Abergavenny.

No. IV. Division A. — *Sea Entrance-Gates, Swing Bridges, Canal Bridge of the Gloucester and Berkeley Canal, Water Wheels, and Iron Roofs. By the late Thomas Telford, Esq., C.E. F.R.S., &c. Plans, Sections, and Machinery of the Weymiss Colliery, complete in ten super-royal and folio plates.*

Plate 1. The Gloucester and Berkeley Canal. 2, 3. 10. An underdip colliery, now working under the Firth of Forth at Weymiss. 4. Extract of a report of the late John Hughes, Esq., on dredging, and the carrier and delivery barge. 5. Original specification of the swing bridges on the Gloucester and Berkeley Canal. 6. Details of the bridges. 7, 8. Description and references of a breast water-wheel and machinery. 9. Plan of the water-wheel. 10. A cast-iron roof, with details.

No. V. Division B.

Plates 1, 2. London and Birmingham railway, Lawley Street viaduct. 3. The Bogie locomotive engine. 4. The Hercules locomotive engine, on the Newcastle and Carlisle railway. 5, 6. London and Birmingham railway goods waggon. 7, 8. Details of the goods waggon, wheels, carriages, &c. 9. Elevation and end view of a tender, as employed on the London and Birmingham railway. 10. The Great Western Railway Bridge, or Viaduct, over the River Thames, at Maidenhead.

The sizes of the plates vary from 24 in. by 9 in. to 44 in. by 19 in.—*J. I. H.*

ART. V. *A Glossary of Terms used in Grecian, Roman, Italian, and Gothic Architecture.* The second edition, enlarged. Exemplified by 400 woodcuts. 8vo, pp. 144. London, 1838.

THIS is a new and very much improved edition of a work bearing the same title, reviewed by a correspondent in our Fourth Volume, p. 249. The present edition is so greatly enlarged, and so amply illustrated by beautiful engravings on wood, that it might well pass for a new work. Of all the architectural glossaries which we have seen, this is decidedly the one which we should recommend to the general reader, or to ladies desirous of obtaining a knowledge of architecture. With such a volume as a companion, the interest excited by all buildings whatever, and more especially by churches, public buildings, ruins, and antiquities, will be greatly increased; and, as we should wish to diffuse a knowledge of, and a taste for, architecture among all classes, we cannot too strongly recommend this volume. If it were to be generally studied by ladies, it would effect for them, with regard to architecture, what Dr. Lindley's *Ladies' Botany* has done with regard to plants.

In order that those who possess the first edition may have some idea of the improvements made in the second, we think it but justice to copy a portion of the Preface.

"The rapid sale of this work clearly shows that something of the kind was required, and has encouraged the publishers to incur a large additional expense, in order to render it more worthy of the approbation of the public. While gratefully acknowledging the favourable reception it has met with, they are far from being blind to its deficiencies, and have endeavoured, in the present edition, to remedy them. The objections made to the work were, that it was too concise, and much too confined to Gothic architecture, especially in the illustrations. The first arose from an anxiety to avoid the opposite extreme, as it is obviously easier to extend such a work than to confine it within prescribed limits; the second, from the nature of the work, the chief object of which is the illustration of the Gothic styles: but in the present edition the Grecian capitals, mouldings, &c., are given. The series of examples of the different portions of Gothic architecture, is also rendered much more complete than before; and the addition of the ascertained or presumed date to each will, it is hoped, prove convenient and useful. As this is the first attempt of the kind, much indulgence may fairly be asked, and a few errors may be expected to have crept in, some

of which are corrected in the errata: the suggestions of Matthew Bloxam, Esq., of Rugby, as to the presumed dates of many of the examples, have been followed, and his remarks and corrections are appended to this Preface.

"At the suggestion of Professor Whewell of Cambridge, some attempt has been made to quote authorities, and thereby to distinguish between terms of long-established usage and those recently introduced: with the kind assistance of Mr. Willis, the latter object has in all cases been effected; but in other instances it did not appear necessary to quote any authority. The Compiler feels bound to acknowledge the great obligations he is under to Professor Whewell and to Mr. Willis, for their advice and assistance, and for the liberal manner in which they allowed him to make extracts from their useful and interesting works: he has also to express his obligations to J. Corne, Esq., for the use of a manuscript glossary, by John Carter, in the handwriting of the late Alexander Chalmers, and apparently compiled by him from Carter's papers in the *Gentleman's Magazine*." (p. vi.)

ART. VI. *Practical Observations on the Asphaltic Mastic, or Cement of Seyssel, now extensively employed on the Continent, for Pavements, Roofing, and Flooring, for Hydraulic Works, &c.; explaining its Nature and Manipulation, &c.* By F. W. Simms, Civil Engineer, late of the Royal Observatory; Author of a "Treatise on the principal Mathematical Instruments employed in Surveying, Levelling, and Astronomy, &c. 8vo, 27 pages. London. Price 1*s*.

THIS is a work which will be perused with intense interest by architects, builders, and paviers, as it bids fair to introduce some important improvements in buildings of every description, waterworks, and pavements. It is a gratifying proof of the alacrity with which new inventions are enquired into in the present day, that the asphaltic mastic, of which nothing was known in England two months ago, but what was contained in a newspaper paragraph, or, perhaps, in the letters of Englishmen at Paris to their friends at home (an extract from one of which letters we published, p. 45.), is already described in detail, accompanied by its history, chemical properties, and various applications, in a work published in London.

Mr. Simms's account of the asphaltic mastic is drawn up with the greatest perspicuity, and supported by documents of undoubted authority; and the following extracts, while they prove this, will put the general reader in possession of all that he can desire to know on the subject. To the professional man, the work itself is essential.

"The ancients were indebted for the preservation of their buildings to the choice of their materials, and particularly to the use of cements, which, perfectly uniting with metal, stone, or wood, rendered their structures firm and solid. Amongst others, the use of a bituminous cement appears to have been extensive from the earliest times. Historians inform us, and modern observation confirms their statements, that the bricks with which the walls of Babylon were constructed were cemented together with hot bitumen. And in the destruction of some ancient remains of fortifications, supposed to have been Roman, near Pyrimont, about forty years ago, the stones appear to have been similarly ce-

mented; and so great was its tenacity, that the works were with great difficulty pulled down, and not without the use of gunpowder. This circumstance led to a singular and important discovery, for the fact of which, as follows, we are indebted to a gentleman named Perrigny, a native of that neighbourhood. During the removal of the above ancient remains, it was observed that the cement bore a great resemblance to the asphaltic mass or mountain in the park of Pyrimont, about five miles north of Seyssel. This led several persons present to think of making a similar application of it; amongst others was a relative of M. Perrigny, whose dwelling on the banks of the Rhone was so very damp, that the lower part could not be appropriated to any use whatever. This person considered that its application might succeed in keeping out the wet, every other remedy that he had tried having failed. The experiment was, accordingly, made, and succeeded beyond his most sanguine expectations. This circumstance, among other early trials of its properties, speedily led to its very general adoption in that vicinity, where the working of this material has become of great importance, and where the presence of the bituminous asphalte it so great as to appear almost inexhaustible; and, although but recently worked to any great extent, yet its properties as a cement appear to have been long known. It already constitutes the chief wealth of the country, which was previously half wild.

"In various parts of the eastern chain of the Jura mountains, there are bituminous veins of greater or less extent; but the only place at present known where the asphaltic rock is to be found is at Pyrimont, above named, in the department de l'Ain. In this immediate vicinity is also obtained a peculiar kind of mineral pitch, there called bitumen, which, upon being mixed in certain proportions with the asphalte, forms the mastic, or cement, of which it is our business to treat, and which, in France, after years of struggling with prejudices, and the opposition of parties interested in its failure, is obtaining so large a share of patronage as to be extensively employed both in the public and private works of that kingdom.

"For many years after the discovery of the valuable properties of the asphalte, the mine at Pyrimont was the property of a company of Swiss merchants; but, from their defects of management, and from the limited extent of their finances, their operations were confined within very narrow bounds; and, at length languishing, the properties of the mastic were likely to have become lost to society. It, however, passed into other hands, among whom we find the English name of Taylor, and also of Mr. Equem, a gentleman who has persevered against all opposition in calling the attention of the French engineers and architects to the subject; and, having executed a variety of works with unvaried success, has secured for it a rapidly advancing popularity in France, where we have lately had an opportunity of professionally examining and acquainting ourselves, not only with its nature, but also with its manipulation.

"The business has now fallen into the hands of a private company at Paris, who, with a capital of 30,000*l.*, purchased the mine at Pyrimont, and are carrying on an extensive trade in its manufacture, with Mr. Equem at the head of the executive department.

"The asphaltic mastic of Seyssel, when prepared for use, is, as before observed, a compound of two mineral substances; one is the native asphalte, the other is bitumen; the proportion of the former in the amalgam is 93 centimes, and of the latter 7 centimes. The asphalte is extracted from the mine in blocks, and reduced to an almost impalpable powder before it is mixed with the bitumen. The latter, as extracted from the mine, is first broken into pieces of about the size of an egg; these are put into boiling water, and the particles which rise to the surface are purified by boiling for 24 hours: the result is, the bitumen to be mixed with the pulverised asphalte. The combination of these two substances forms the mastic or cement, which, being reduced to a fluid state by the application of caloric, is poured into moulds of any shape required; or, in this state, used as cement in hydraulic works, &c. The use of the bitumen appears to be the giving of ductility to the mastic; and, if a

very minute quantity of sulphur be added, the mastic will become hard, and partially brittle.

"In France, where, with the exception, we believe, of Belgium, this mastic has, at present, only been employed, attempts have been made to imitate it; but in these fictitious compounds substances have been introduced instead of asphalte, which absorb from 40 to 50 per cent of bitumen, forming a composition which the heat of the sun will melt, and which cracks when exposed to the cold of winter. In other instances, matter has been substituted which, having no affinity whatever for bitumen, disintegrates with time. When in Paris, we had an opportunity of making a fair comparison between the genuine and the fictitious materials. In the abattoir of Montmartre, one of the great public slaughter-houses of Paris, a part has been laid down with the mastic of asphalte, and another part with the fictitious mastic, both as substitutes for flag-stone pavement; for this purpose, perhaps a more severe test of their respective merits could not have been found, being exposed to the tramping of men and cattle, the dying struggles of the latter, with the blood and water with which it is constantly deluged. The flag-stone pavement hitherto used required frequent repairs and renewal; yet so great are the tenacity and hardness of the genuine mastic, that, although it had been thus in use for many months, it appeared as if it was new; whilst, on the other hand, the fictitious mastic had worn so much in holes as very much to resemble a honeycomb; and these holes being filled with blood and filth, presented to an unaccustomed eye a very disagreeable sight.

"The genuine mastic possesses the hardness of stone, and yet preserves a certain elasticity. When used as pavement for terraces or footpaths, it appears to resist the wear equally well with granite; and, when prepared in the manner now adopted in Paris, it is difficult to distinguish it in such situations from that stone. One of the finest specimens of paving that ever came under our notice, and which, at first sight, we mistook for granite, is that on the north side of the palace and gardens of the Tuilleries: it is about 1100 yards in length, and 10 ft. wide; it is composed of the asphaltic mastic; and the joints, which transversely cross it the whole breadth, and which at present appear to divide the pavement into a number of large equally sized slabs, are disappearing, by the mastic becoming more dense from the tramping of feet; so that this extensive piece of pavement will soon appear, from end to end, like one immense sheet of stone.

"A few minutes after the mastic has been spread in a fluid state, it again takes its natural density, which is such, that, at the heat of 30° Réaumur (equal to 100° of Fahrenheit), it resists all impressions from an ordinary force. Its extensive application to the covering of buildings, instead of tiles, slate, or lead, has induced the trial of experiments in France, by which it was ascertained that it is anti-electric, a property which it is desirable that all bodies should possess that are employed in roofing. Its application, also, for the flooring of halls, passages, and apartments is in no way dangerous on account of fire, as it is not inflammable, the quantity of pitch which it contains being so very small. For the floors of underground kitchens, &c., it is particularly applicable, it being warm, and keeps out all damp, as well as vermin and insects, which are frequently so abundant in such places. When employed in the construction of water-tanks or reservoirs, it imparts neither taste, smell, nor colour to the water it contains."

Having thus stated, generally, that, with possessing the durability of the hardest stone, it is wholly impervious to moisture, while it possesses the advantage of almost indefinite extension; or, where joints cannot be avoided, of being so closed as to present a continuous surface; Mr. Simms next produces his documentary evidence. This consists of letters from French

architects, engineers, &c., stating the uses which they have made of the cement: the details of four experiments made to prove its strength and durability: a quotation from Buffon, in which he says, "Thirty-six years ago, I caused to be plastered over with asphalt a large basin in the garden of Natural History, which ever since has been perfectly retentive of water:" instances in which asphalt has been substituted for flag-stone pavement: on the application of asphalt to roofing: reference to certificates of military engineers, and twenty-two of the principal architects of France, dated as far back as 1827, as to its use in hydraulic constructions for roofs and terraces: instances of the application of asphalt to flooring, &c. The retail prices of the asphalt, both in its native and manufactured states, as charged by the company at Paris, are next given; by which it appears that foot pavement costs about 6½*d.*, and roofs 8½*d.*, per square foot. A comparative view of prices of slate, lead, &c., is added; after which follows a geological account of the mine of asphalt at Pyrimont, from the *Bulletin de la Société Géologique de France.* An appendix contains the opinions of Lords Elgin and Lincoln, and Sir John Hay, Bart., dated Paris, Nov. 23. 1837.

No material promises to be so well adapted for realising our idea of a narrow strip of flag-stone, or an equivalent to that, along the centre of all the footways in the neighbourhood of towns, to a distance from towns varying according to their extent and population. Substitutes for gravel walks, in gardens having steep surfaces, may also be made of it; and, indeed, for the walks of kitchen-gardens, and for all street-gardens, it will probably be found superior to every thing else.

MISCELLANEOUS INTELLIGENCE.

Art. I. *General Notices.*

Harper and Joyce's new Stove and improved Fuel. — In our preceding Number, p. 46., while noticing an American stove that produced no smoke, we referred to an account which we had given of Joyce's self-consuming stove in a contemporary Number of the *Gardener's Magazine.* In that account, we stated that we had seen the stove in action for several hours, on December 5., in the Horticultural Society's meeting-room, in Regent Street. We stated that the stove was remarkable in several respects: 1. In producing no smoke or offensive vapour or odour of any kind; 2. In the extreme cheapness and immense heating power of the fuel employed, a pound or two of the material (which does not cost above one halfpenny per pound) serving to keep up a sufficient temperature, in a moderate-sized room, for 20 hours; 3. In its requiring very little labour, the charge being put in at periods of from 15 to 30 hours apart, and no attention whatever being required in the intermediate space; 4. In its perfect freedom from dust, and in no noise being required to keep the fuel burning, as in stoves which require the use of the tongs, poker, &c.; 5. In its comparatively perfect security from accidents by fire, no part of the flame or ignited fuel being visible. This may be enough to give some idea of the invention, the great excellence of which consists in saving every par-

ticle of heat produced by the fuel, as in the case of burning charcoal in the middle of a room; but without producing any of the offensive or deleterious vapours which arise from charcoal, and the other fuels in common use, when so consumed.

Since our article appeared in the *Gardener's Magazine*, the inventor, Mr. Joyce, a gardener at Camberwell, has taken out a patent "for an improved apparatus for heating churches, warehouses, shops, factories, hot-houses, carriages, and other places requiring artificial heat, and improved fuel to be used therewith. Sealed December 16." The specification to be given in within 6 months. (*Repert. of Patent Inventions*, Jan., 1838, p. 62.) A partnership has been formed between Mr. Joyce and Mr. Harper, and the stove has lately been exhibited privately to some friends and scientific men at the Jerusalem Coffee-House, Cornhill. We may remark here, as a singular fact, that this patent was opposed by an individual who appears to have thought that he had made the same or a similar invention. He obtained an injunction, but that was shortly afterwards dissolved. Scarcely any thing was said respecting this mode of heating in the daily, weekly, or monthly journals (except the *Gardener's Magazine*), that we are aware of, till January 13.; when the *Mechanic's Magazine* and the *Literary Gazette* contained each a short article on the subject, of which the following is the essence:—

Joyce's new stove "is in the form of a tall urn, having a pipe running entirely through the centre, with a cap, or valve, at the top, to regulate the draught. The urn is of thin bronze, about 2 ft. high, and 8 in. in diameter. By the combustion of the fuel inside, the metal continues at a dull red heat, and so gives off the caloric to the surrounding air. The fuel is stated to be a vegetable substance, and one charge in a stove of the above-described dimensions will burn for 30 hours, and will cost sixpence. No smoke or effluvia are produced." (*Mech. Mag.*, Jan. 13. 1838.)

"*The new Mode of Heating Rooms, &c.*—The puzzle which has been shown at the Jerusalem Coffee-House has set the wits of conjecturers at work upon the nature of the particular fuel which, at so cheap a cost as one farthing an hour, is to warm a room. Of these conjectures we have heard two: the first is, that the gardener who discovered the fuel, which enabled him to keep up the fire whilst he slept, must have used old tanner's bark, as it was the only fuel accessible in a hot-house; the other is, that charcoal is the base, and lime employed to absorb the carbonic acid gas. Gipsies are in the habit of using the ashes of their fires, raked together in a heap, and sprinkled with lime. This will burn throughout the night, and give out much heat, and no deteriorating gas is evolved to distress the sleepers in the gipsy tent." (*Lit. Gaz.*, Jan. 13. 1838.)

Whatever may be the fuel employed, the invention, unless some objection be discovered to it, which has not yet been foreseen, will prove an immense source of economy, in money and in labour, to all those nations throughout the world who are obliged to heat artificially the apartments in which they live. As we have said in the *Gardener's Magazine*, this invention promises to hold the same rank in domestic economy (that is, the art of house-keeping), as the invention of gunpowder does in the art of war.

New Material to be applied to Dwelling-houses, to render them capable of resisting Fire.—About the middle of November, 1837, the scientific world was somewhat startled by observing, in the newspapers, an announcement that a discovery had been made and perfected, of a material to be applied to dwelling-houses, capable of entirely resisting the action of fire; that an experiment was to be made to prove its efficacy, at White Conduit House, Nov. 25. 1837; and that the presence of all parties concerned was requested to view the exhibition. It might have been supposed that the answer to this appeal would have been universal; and, as parties generally attend where there is nothing to pay, and they really are interested, that half London would have been present on the occasion. But, unfortunately, John Bull has had "Wolf!" shouted to him so often of late, mighty discoveries have turned out "such fantastic tricks,"

that he has grown very sceptical indeed. There was, however, a tolerably numerous party collected at White Conduit House on the day of experiment; some, of course, interested in its success; others, perhaps, equally so in its downfall. The material is, in appearance, a cement, and, like it, may be applied with the trowel, or with a brush in the manner of paint. Mr. Dewitte, the inventor of this composition, considers that it should be applied to the timber of a house while building, about a quarter of an inch thick; or it may be employed instead of the common plaster now in use, as it can be worked with equal facility, and polished and painted the same. Sufficient quantity has not yet been prepared to form any certain estimate of the expense; but he considers that the cost of preparing the whole of the timbers of an 8-or 10-roomed house would not exceed 30*l.* or 40*l.* For the experiment, two little wooden houses had been constructed; the one prepared interiorly, with the exterior just washed over, to show the nature of the composition, and the other left in its natural state. These were filled with shavings and fired: the one not prepared was, of course, immediately one mass of flame; while the other resisted every effort to ignite it. It was delightful, at this moment, to watch the disappointment of the oppositionists, who afterwards took an unfair advantage of a neglect on the part of the proprietors. When the burning mass of the unprepared house was at its greatest heat, they busied themselves to turn it round close upon the other building, though Mr. Dewitte assured them that the exterior of the building was not prepared. After some time, it began to burn, and they gloried in their triumph, until the one building, having burnt itself out, dropped to the ground, and discovered the side of the other partially burnt away, but with the inside coating and the rest of the building as perfect and unharmed as if it had never been touched, notwithstanding the furnace heat that had been applied to both sides of it. The persons assembled, among whom were Mr. Barry, and other eminent architects and scientific people, declared themselves perfectly satisfied of the complete success of the material: the only hope expressed was to see the experiment tried on a larger scale, when the proprietors shall be better prepared for it. Convinced of its perfect efficacy and value, I only trust that they will immediately set about preparing a more extensive trial, to prove to those who were so anxious to throw cold water on the invention, that it is of no more use in stopping their progress, than it would be in stopping the progress of the flames when we shall enjoy the security of having our houses prepared with their composition. — *A. December*, 1837.

Hydrostatic Measurement of Timber. — In the West India Docks, mahogany logs are weighed in a crane; and their weight marked on one end. Now, it would be practicable also to measure these logs at the same moment that they are weighed: I mean, taking their solid contents. Thus, suppose a log weighs 25 cwt. 1 qr. 14 lb.: it would be, when reduced, 25·375 cwt. Then, as the cubic foot of fresh water is 62½ lb. weight, we have only to multiply the specific gravity of mahogany by 62½, and we find the weight of a foot of mahogany to be 66½ lb. nearly. With this as a divisor, and the 25·375 cwt. reduced to lbs.

making 2842·000 as a dividend,

$$\text{we have } \frac{2842}{66{\cdot}5} = 41 \text{ feet odd.}$$

Thus we see how, by means of water, of which the mahogany is a palpable form, we can measure the products of water.

The only difficulty in obtaining by this means a compound weighing and measuring crane is, that we cannot find two pieces of the same wood, or wood of the same name, of the same specific gravity. If all oak, all fir, all ash, all teak, all mahogany, were of the same specific gravity, we should have a constant multiplier for each sort of wood; and then, by the simple operations of multiplication and division, we could accomplish our purpose. The rule, in words, is: Multiply the specific gravity of the wood, whatever it be, by 62½; and the produce will be the weight of a cubic foot. Then divide

the weight of the log or stick in pounds avoirdupoise, by the weight of its cubic foot; and the quotient will be the solid contents in feet of the stick. — *A. J. Jan.* 1. 1838.

Art. II. *Domestic Notices.*

ENGLAND.

Lighting the House of Commons. — On Friday evening, January 5., Lord Duncannon, Mr. Baring, and several other members of parliament, attended in the House of Commons for the purpose of observing the result of a new plan, proposed to the committee by Dr. Reid, for lighting the house with gas. In the lobby were stationed two engines and a strong body of firemen, in readiness to operate upon any part of the house, in case of accident from any outbreak of flame. Between the benches of the galleries were also stationed men, with buckets of water, for the protection of the roof, to which the experiment was almost exclusively confined. Three lines of tubes were laid down upon an inclined plane, immediately under the slopes of the roof, and over those windows in each side of the ceiling from which, in the daytime, the light descends. Behind the row of panes of glass, in the wall over the door opening into the reporters' gallery, was placed a single tube. There were no tubes at the other end of the house. A few minutes after four o'clock, the main cocks, which are all on the Abbey side, were turned, and three lines of strong illumination shot down light on the floor from the roof, and one line from the reporters' gallery. In the former, the flames issued in oval jets, about an inch in length, and a quarter of an inch asunder, not less than 1500 in a row, and incessantly flickering. From the single tube at the reporters' gallery, each flame issued in a triple jet. The view had a dazzling effect from the floor; and the light, without being in the least distressing to those who stood beneath, enabled one to read the smallest print with ease. No smell whatever was perceptible, the carbon not being permitted to come below the glass.

The object of the proposed use of gas (the effluvium being prevented from descending, as already stated) is to discontinue the burning of wax candles in the chandeliers; and thus, by saving a quantity of air hitherto carbonified, for the respiration of persons within the area, to give greater efficacy to Dr. Reid's plan of ventilation, which has not been as yet carried out. To promote this plan, the number of holes in the floor are now being doubled. Through these the air ascends very densely when the carpeting is off the floor: it rushes in at the doors with the force of a gale; but it is said that, if a man were to stand near the valve of the shaft over the ceiling, the current of air would blow him over. The expense of gas is calculated at nearly 30*l.* a night; that of candles, at not more than 5*l.* Mr. Wakley, who was in the House, said the gas burned, in the chambers above the ceiling, at a temperature of 130°, drying up the lath and plaster, and all adjacent combustible matter on the roof; so that the fabric would, from the slightest accidental creation of flame, take fire, and burn like touchwood. In his opinion, the glass in the windows would crack before ten hours. (*Times*, January 6. 1838.)

Ventilation of the House of Commons. — Several noblemen and gentlemen were present, on the evening of December 30., in the House of Commons, to witness certain experiments made by Dr. Reid with reference to the ventilation and lighting of that house. In consequence of the complaints made upon this subject during the present session, the attention of Dr. Reid was called to it; and, accordingly, that gentleman came to town from Edinburgh to enquire into the causes of the inconveniences of which the members had complained. It would be difficult to furnish our readers with an idea of the precise method adopted for diffusing and equalising the progress of the air from the lower chambers of the House of Commons; and to explain the precautions by which Dr. Reid considered it necessary to give complete effect to his plan. It is sufficient to observe, that the complaints had reference to the dryness of

the atmosphere, and the quantity of dust which was stated to have risen from the floor of the house, and to be inhaled by the members. In order to prevent the first of these inconveniences (namely, the dryness of the atmosphere), extensive arrangements had, we understand, been made before the opening of last session of Parliament, but were suspended, owing to the concurrent approbation expressed by members of all parties of the improved ventilation of the house by the steps already taken.

For preventing any inconvenience from the diffusion of dust in a room frequented in all weathers, and all times of the day, by a large body of persons, Dr. Reid had, besides other things, introduced a hair-cloth, of particular texture, for the floor. This cloth, during the whole of last season, appears to have been lifted with comparative regularity and attention to the object for which it was designed. The result of Dr. Reid's examination, since he has come to town, is, that an article of a totally different texture, and wholly unfit for the purpose, has been substituted for it during the present session; and that even this had not received the attention bestowed on the hair-cloth of last session. It will be obvious that it would be impossible to avoid all inconvenience from the diffusion of small particles of dust, but by the adoption of another plan suggested by Dr. Reid when his plans were first put into execution, and by which a current of fresh air would descend from the ceiling, instead of ascending, as at present, through the floor. For the adoption of this plan, however, a new mode of lighting the house would be indispensable. The first step to which must be the removal of the lights at present used within the body of the house. It was part of the original plan that these lights should occupy a space separated from the lower portion of the body of the house by a ceiling of glass, and through which, in fact, the house is at present lighted in the daytime.

A trial of this plan took place on the evening of the 30th of December last; and although the preparations are as yet necessarily very imperfect, having been got up within the short interval of twenty-four hours, so far as we could judge, we anticipate a successful result. (*Morn. Chron.*, Jan. 1. 1838.)

Serjeant's Inn, Chancery Lane. — Within the last month, great progress has been made in the street front of the new building, the walls of which are now carried up nearly to the top of the first floor above the basement. At present, the work is quite in the rough, preparatory to being stuccoed; therefore it is impossible to speak of the style or details, beyond conjecturing that they will, if not be precisely similar, resemble those of the portion behind, already finished; and, as there will be thirteen windows on each of the upper floors, the whole cannot very well fail to be a rather conspicuous piece of street architecture. In the basement there will be only eleven windows, viz. three in the centre, between two large square-headed entrances (one of which is intended to form an open passage into the court), and four on the side of each of these doorways. These latter, and each of the extreme windows, are placed in slightly projecting breaks; thus there are four narrow compartments with three windows of a floor, between them. — *W. H. Dec.*, 1837.

The late Royal Exchange. — If our architects do not erect a temple to Vulcan, they will show themselves to possess little gratitude; for that classical fire-king has just been doing what, it may safely be presumed, will lead, as a matter of course, to an open competition of designs for a new Royal Exchange. And it is further to be hoped, matters will be managed somewhat differently on this occasion from what they were on a late one, by there being a public exhibition of all the drawings beforehand, instead of after the decision shall have been made. Perfectly am I aware that the mode here recommended to be pursued is not entirely free from objections, or that it must of necessity insure the adoption of the very best design of all: in numerous cases, for instance, the authors of the respective designs would probably be recognised almost immediately by their style, both in regard to taste and composition, as distinctly as if their names were attached to their drawings (at least, by their brother architects), and, consequently, not long remain concealed from the public. On the other hand, those who had interest

with influential persons, might contrive that they should be at no loss to know in favour of what particular design they ought strenuously to exert themselves. Still, taking the very worst view of the matter, there would be a very strong check upon favouritism on the part of the building committee, and of prejudice as to names on the part of the public; and, although we may not be able to steer entirely clear of every thwarting contingency, it is but prudent to adopt every possible precaution while it is in our power to do so.

Besides securing a show, at least, of deference to public opinion and criticism, those with whom the ultimate selection rested, would find their task greatly lightened by having the opportunity of leisurely reviewing all the designs from time to time, after they had been hung up, and comparing them together, before they proceeded to sit formally in judgment upon them. Their labour, too, would be greatly abridged, were they gradually to weed out at intervals all such designs as were obviously inferior, and, consequently, had no likelihood of success, until they had reduced the whole collection to a dozen or so, that should demand a strict scrutiny into their respective claims. Were this done, in proportion to the difficulty of passing the final award would the danger be lessened of making an injudicious choice; because, supposing the merits of the remaining designs to be so nicely balanced as to render it no easy matter to decide to which of them the preference, upon the whole, ought to be given, it is not likely any very serious error of judgment should be committed.

One objection as yet overlooked is, that, were such a mode of proceeding as is here recommended resorted to, many who stand high in the profession would not care to expose themselves to such a touchstone of their ability, and to risk the chance of being put aside among the discarded. No matter: let them, then, stand aloof; though, as the names of the unsuccessful would not be divulged, they might keep their own counsel, and confine their disappointment to themselves.

That there will be an entirely new structure, may be taken for granted; because, although the external walls are still standing, it will be found indispensable to take them down; or, even should it prove possible to retain any part of them, it would be little less than an absurdity to adhere in any respect to the plan of the old fabric, and voluntarily forego the advantages of one that may be rendered greatly more commodious for transacting business, and certainly very much superior in point of taste. I forbear from here animadverting upon the solecisms, in this last-mentioned respect, which the building just destroyed exhibited; it is enough to remark that even in the other, it was very far behindhand compared with such edifices as the new Exchange at Glasgow or the Bourse at Paris. All that it could boast, in the way of accommodation for those who frequented it, was, that, as far as mere space went, it was tolerably roomy, if its visitors were content with standing-room in the open quadrangle, let the weather be ever so wet or inclement; but it certainly was not a place for its merchants, befitting the first mercantile city in the world. I will not go so far as to say that, even had it not been destroyed by fire, it ought to have been pulled down, and a more suitable edifice erected in its stead; but I do say, since all that has been spared of it must come down, let the citizens of London console themselves for its loss, by availing themselves to the fullest extent of the opportunity thus forced upon them. One thing which it will now be in their power to do is, to widen and otherwise improve Threadneedle Street, by making that front of the Exchange parallel to the Bank, which it is to be presumed the ingenuity of our architects will be able to effect, without injury either to external or internal design. For the space that must thus necessarily be given up at one angle of the general plan, much more than an equivalent may be gained, by getting entirely rid of the shops which have hitherto encumbered the lower part of the building, and which certainly did not confer on it any dignity.

Without an accurate plan (and at the moment I am unable to refer to one of any kind), it is impossible for me to judge how far it would be possible to give greater capaciousness to a new edifice, without extending the site occu-

pied by the old one. For the present, however, I have said quite enough, even in my own opinion, — in that of others perhaps somewhat more. Doubtless, my pen is not the only one from which you will receive communications bearing upon the same subject: and, indeed, now that people begin to be tired of talking and writing, and sending forth pamphlets, *anent* the new Houses of Parliament, the late "awful conflagration," as the newspapers joyfully announce it on their placards, is a perfect *God-send* to the architectural world; that little sphere in our modern system of the plurality of worlds, wherein I am fain to include amateurs, in spite of even Mr. Gwilt himself, and among them, if not exactly the unworthiest of the unworthy, the most arrant scribbler of them all — *Candidus. London, Jan.* 15. 1838.

[The Royal Exchange was burned down on the night of Jan. 10.; and a copious account of it will be found in all the daily newspapers of the 11th and 12th, and an excellent one in the *Dispatch* of Sunday, Jan. 14. In vol. i. of Britton's *Public Buildings of London*, there is the most copious and correct historical account of the Royal Exchange which has been published, illustrated by an elevation of the south front, and a view of the piazza; and in the second volume of Campbell's *Vitruvius Britannicus*, there are both a ground plan, and an elevation of the front with the original tower, and two lanterns at the end, which were afterwards removed. — *Cond.*]

Art. III. *Restrospective Criticism.*

Erratum. — In Vol. IV. p. 593., line 3. from the bottom, for "ancient Greece," read "ancient Greek."

The Glyptotheca at Munich. (Vol. IV. p. 593.) — Your correspondent, G. B. W., refers your readers to Dr. Granville's work *On the Spas of Germany* for an account of the Sculpture Gallery at Munich; and seems impressed, from the doctor's rather too florid description, with an exaggerated idea of its magnificence and importance.

When I was at Munich, three years ago, I was much disappointed with this Glyptotheca, as the learned, antiquarian, and poetical king, Louis, has named it. Previously to arriving in Munich, I had heard the Glyptotheca spoken of with enthusiasm as a national monument; and, when I heard that the façade was *ganz vom Marmor*, I too, I own, was induced to form a high opinion of its splendour. To northern nations, the thought of a building entirely of marble has something imposing in it: it conveys the idea of a sort of palace of Aladdin; but the magic lamp, with all its powers, drops from our hand when we at last look upon the buildings themselves; as who will not own, that has seen the cathedrals of Milan or Florence? Their boasted marble adds but little to their magnificence; and few strangers, not apprised of the fact, would ever dream that marble was the valuable material of their structure, until they referred for information to their guide-book. But we have now an example of this fallacy nearer home, in the obstruction (commonly called triumphal arch) in front of Buckingham Palace.

To return to the Glyptotheca: the façade is of marble, certainly, entirely of marble; but this is not observable at first sight, as it has already assumed a light stone colour. The dimensions are insignificant, and, consequently, the effect, upon a first approach, is rather that of a graceful model, than the magnificent building that Dr. Granville's work would lead us to expect. It is extremely pure in design, quite Greek; but, from this very cause, it is low; a great defect to a modern eye, accustomed to lofty buildings, even in our common streets. The pure Greek wants much *adapting* to modern views: a simple copy will not do; in proof of which, I almost dare assert that, could one of the noble temples, whose ruins I visited at Pæstum, be transplanted to one of our open squares, its effect would not be striking, unless greatly elevated upon a noble basement of some description, or approached on all sides by deep flights of steps; and in this view, I believe, I am borne out by the good effect produced by such an arrangement in the Exchange at Paris. Of such

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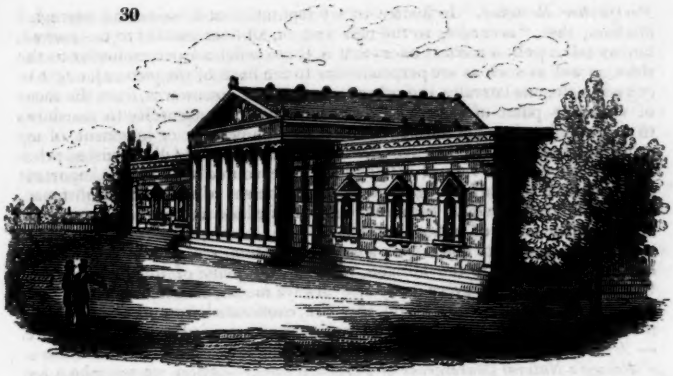


artificial elevation the Glyptotheca possesses nothing: there it is, a building of one story, nearly flat upon the ground; which, combined with its want of height, is a defect from which all its purity of design can never extricate it. *Fig.* 30. may give some idea of the style of building, though, doubtless, much less made out than the plate given by Dr. Granville, which I have not seen. The interior contains nine rooms, tolerably lighted, and containing a good collection of ancient sculpture; but they struck me as low and small, and, with all their pretension to mosaic and fresco, produced in their ornaments and decorations an effect chillingly cold.—*H. N. H.*

Davis's Gothic Ornaments.—I hope it is never too late to give praise where it is merited. Mr. Davis's *Gothic Ornaments illustrative of Prior Birde's Oratory in the Abbey Church of Bath* is one of the few works of the kind which careful drawing, on a large scale, entitles to a place in every architect's library; for, although the subjects are not numerous, they are excellent as studies for young artists, and carvers both in stone and wood.—*E. B. L.*

Parsey's Natural Convergence of Perpendiculars. (Vol. IV. p. 518.)—Candidus says, "What is to be done?"—"Really, this notable discovery of Parsey's brings us into a most perplexing dilemma; since, even were we ever so much inclined to do so, we cannot very well allow him to be right, without pronouncing all artists before now to have been entirely in the wrong."—"Seeing that it is utterly at variance with the *vested interests* and reputations of the greatest names in art."—These feelings have always manifested themselves on all great and useful discoveries. To Candidus's question it may be answered, that nothing will be more satisfactory to all parties than to adopt the new system, as it is incontrovertibly based on the true and immutable principles of nature; to which some unprejudiced scholars and artists of great reputation have testified. With respect to the dilemma he speaks of, would it not be more criminal to keep all present and future artists in the wrong, by arresting the new sources of reputation now opened to them, for the sake of those who have enjoyed the untarnishable praises due to distinguished merit? Candidus is pretty candid in setting aside my interest and reputation, when he speaks of vested interests and reputations. Probably, there is nothing more difficult than "rectifying" wilful prejudices: however, common sense will ever force truth to the foremost rank, whether the present race enjoy the enlightenment at command, or leave it to break forth in the next; when *that* generation may justly depreciate the blind obstinacy of the present, who shut themselves out from the merit of the past, and the credit of advancing the knowledge of the future. Candidus's questions about "lofty buildings appearing narrower at the top than at the bottom, &c., are fatal to his reasoning against the natural convergence of perpendiculars, as that is popularly known to be a natural effect, for which no laws are to be found in science, except in

Perspective Rectified. In justice to *my* reputation and *my* vested interest, I disclaim, that, "according to the new system, all lines parallel to the picture, horizontal as well as vertical ones (that is, those which are perpendicular to the sides, as well as such as are perpendicular to the base, of the picture), ought to converge, the one laterally, the others upwards and downwards, from the focus of vision, or point of sight." The attribution of this absurdity to me shows that Candidus has not formed an accurate knowledge or judgment of my principles, from his acknowledged *hearsay* information. As distinguished scholars and artists of all refined nations have endeavoured to solve this important problem from the earliest ages, the accomplishment of it by an Englishman, one should think, would naturally claim immediate recognition, if it were merely on the score of national pride.

The appearances of objects, or *what is really seen*, are seldom to be found on a plane vertical to the horizon, wihch is the plane of the picture which Candidus means, and every body else always meant, Hogarth and all! As this law has escaped observation, they are exonerated from any imputation; the satire will lie against those who violate the laws of nature for the future. — *Arthur Parsey.* 23. *Piccadilly, December* 13. 1837.

Parsey's Natural Convergence of Perpendiculars. — Allow me to make a few observations on a paper by Candidus (Vol. IV. p. 518.), not for the purpose of supporting the doctrine which he controverts (for, though he is wrong, Mr. Parsey is not right; and, indeed, I once took the liberty to tell him so in a public lecture-room, though, I hope, with courtesy), but to point out the mixture of truth and error which it contains.

Candidus, then, in his first paragraph, says, "I will make bold to deny that vertical lines converge, and ought to be so represented." Now, if I understand what he means by the former part of this sentence, I must submit to him that he makes *too* bold, for he "makes bold to deny" the truth; since no one who considers the subject can entertain any doubt but what perpendiculars do converge, though, as I intend to show, they ought *not* "to be so represented." Nay, more, not only vertical, but horizontal, lines also converge. So, then, Candidus is right when he says, "Not that there is one law for vertical, another for horizontal, lines;" but wrong when he explains himself by adding, "Horizontal lines, when they are parallel to it" (the picture), "merely decrease according to their distance, without in any degree converging;" and, that he may not accuse me of having "but half done my work," I will try and prove "this last-mentioned fancy also."

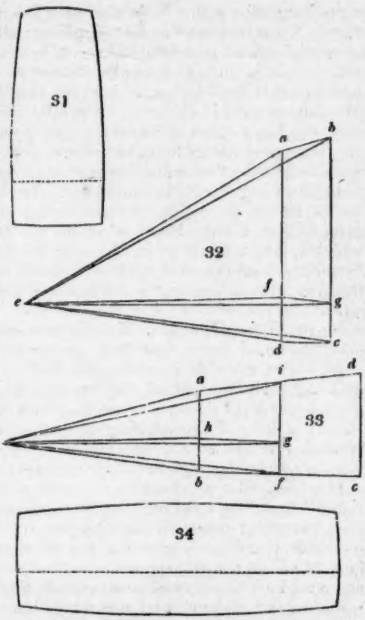
Now, if a person place himself opposite the side of a tower (or any building), the top must be further from him than that part which is directly level with his eye; and, therefore, the width there must appear smaller, as all things diminish as they recede; a principle which Candidus, I think, will not deny. The two angles of the tower, then, will appear closer at the summit than on the horizon (though the eye may not detect the difference); and, if this is not convergence of perpendiculars, I do not know what it is. Next, let this spectator situate himself directly opposite the centre of a long façade instead of a tower; then the two ends or extreme angles of the building, being farther from him, will appear lower than the centre, on the same principle as before; and, unless this is convergence of horizontals parallel to the plane of the picture, I know not what to call it. I am aware I here go further in some respects than Mr. Parsey himself; and, as I told him, I conceive I am correct in so doing.

For any, however, who may wish to look at the question in a more mathematical dress, I will subjoin the following plain demonstration, in which I have, I think, introduced all the important steps.

As all the angles of a triangle only equal two right angles, in every right-angled triangle the right angle must be greater than either of the other two; and, as the greater angle is subtended by the greater side, the side opposite the right angle will be greater than either of the other two sides.

Let, then, *a b c d* in *fig.* 32. represent the side of a tower perpendicular to the horizon, and of the same width all the way up; then *a b*, *f g*, and *e d*,

being the measures across at the summit, the horizon and base will be equal. Let, also, *e* represent the place of the spectator's eye. Completing the figure, *e f a* is a right-angled triangle; of which *e f a*, being the right angle, *e a* is the greatest side, and therefore greater than *e f*. In like manner, *e b* is greater than *e g*; that is, *a b* is further from *e* than *f g* is.



Now, as with equal arcs or chords, angles vary inversely as the radii; and, as the chords *a b* and *f g* are equal, and the radii *e a* and *e b* are greater than the radii *e f* and *e g*; therefore the angle *a e b* is less than the angle *f e g*. In the same way, it may be shown that *d e* is less than *f g*; that is, that the angles of the tower appear to be nearer at the top and bottom of it, than directly opposite the eye.

In like manner, let *a b c d* (*fig.* 33.) be a façade of equal height throughout, and *e* as before; then *a d*, *a b*, *c d*, and *i f*, being the height of the angles, and directly opposite the spectator, are all equal. Then, as before, *e g h* being a right-angled triangle, of which *e g h* is the right angle, *e h* is greater than *e g*, and, in like manner, *e a* is greater than *e i*, and as before. Angle *a e h* is less than angle *i e g*; that is, *a b* looks less than *g i*, and, similarly, *h b* looks less than *f g*; therefore, *à fortiori*, *a b* looks less than *f i*, or the height at the angle looks less than towards the centre. In the same way, *c d* will appear less than *f i*; and, if *i d* is equal to *i a*, the figure in the eye, on the theory that an image is depicted on the retina, and supposing that were a plane, will be something like *fig.* 34. and the tower like *fig.* 31. It will not be necessary to prove that the lines will be curves, though they will be. It must be observed, that the drawing of *figs.* 32. and 33. is necessarily somewhat distorted to show the line *e f*, *e h*, &c. For a similar reason, the curves of *figs.* 31. and 34. are exaggerated.

So, then, it appears that it is the vision of Candidus, and not that of Mr. Parsey, that is "altogether different from that of the rest of the world;" and so, too, "the summit of a lofty building" "does show itself sensibly narrower than the lower part;" a fact of which Candidus might satisfy himself by the use of a sextant, or even a common rule, minding to keep it always at the same distance from his eye. The reason why the eye does not discover it is, that the difference is but very small; because the distance at which we view a building is generally several times as great as its height or width, and the difference of distances from the eye is therefore only fractional, and, consequently, the difference of apparent dimensions only trifling. Another reason is, that when we see a number of lines are parallel, we suppose they *look* so, though, in fact, this is an optical illusion.

One would imagine, if one felt unkind, that the reason why Candidus objects to Mr. Parsey's theory is similar to the Pope's objection to the solar theory of Galileo; that, if he were right, all his predecessors, His Holiness not ex-

cepted, must be wrong. So Candidus: — "Really, this notable discovery of Parsey's brings us into a most perplexing dilemma, since, even were we ever so much inclined to do so, we cannot very well allow him to be in the right, without pronouncing all artists before now to have been entirely in the wrong." "What," he asks, "is to be done? Are we, out of complaisance to Mr. Parsey and his discovery, to revolutionise that part of drawing to which it relates?" No, not unless true; but, if true, then I answer, Most certainly. Are illustrious names to make error venerable? Shall we allow truth to be sacrificed to the "vested rights and reputations of the greatest names in art," or to any thing else? Certainly not. Let truth have its way; and, in order to this, let fair discussion be maintained. Ridicule is not the way to answer a man, before having heard what he has to say. If the matter is worth noticing, let it be done in the way of fair argument, without appeals to "modesty," insinuations of "very great delusion," and wilful blindness to truth, or accusations of "inordinately ambitious" views and "preposterous ideas."

So much for Candidus. Let us now see whether Mr. Parsey is right. I have shown, I hope, that both horizontals and perpendiculars converge. Now, ought they to be so represented? I answer, No. Because the eye puts not only the natural objects into perspective, but also the picture or representation of them; so that the lines of the diagrams may be taken as the actual lines of the drawing, instead of representatives, and the demonstration remains as complete as ever. So, then, *figs.* 31. and 34. are not what are to be drawn, but only the figures which are formed in the eye.

One particular inconvenience, greater than the destruction of "vested rights" Candidus talks of, would result from our being obliged to make these lines converge; namely, that, when we viewed any picture, we must always have our eye directly opposite the junction of the horizontal and vertical lines to which the others converge, and at one particular distance from it, and must look steadily and steadfastly at that point alone, or else all the parts would be out of drawing; for every time we move our eye we alter the perpendicular or horizontal lines to which the others converge. Fortunately for us, then, Mr. Parsey's theory is not correct.

The fact is, we have only length and breadth on which to represent length, breadth, and thickness. This last must, therefore, be represented by the convergence of its lines. When we have thickness also, we do not converge or decrease, but only diminish the scale, as in a model.

In one point, Mr. Parsey is right, practically as well as speculatively; viz. that perpendiculars decrease in apparent length as they are raised from the horizon of the spectator: *e. g.* a story 30 ft. above the eye will not look so high as one of the same height directly before the spectator. This is observed by some draughtsmen, though generally the correction necessary is small; but by most I believe it is neglected.

I should not have troubled you with this, but, as the subject had been touched upon, I thought your readers might imagine no stronger reasons could be brought against Mr. Parsey's theory than had been adduced. I also *thought* that Candidus did not treat him quite so courteously as I have no doubt he would have done had he had an opportunity of seeing and hearing him. — *Wm. Willmer Pocock, jun., A.R.C., Ass. of Inst. Brit. Arch. Knightsbridge, Dec.* 5. 1837.

Remarks on the Convergence of Perpendiculars. (Vol. IV. p. 518.) — If Candidus had reflected a little more attentively on the cause of the apparent convergence of retiring lines, he would not have been so witty at Mr. Parsey's expense, and would not have committed the absurdity of supposing that perpendiculars were not subject to the same laws as horizontal or inclined lines.

First, Let *fig.* 35. be a space of flat pavement, the chequering lines of which are at right angles to each other; one series going to the point of sight *a*; consequently, the others are all at right angles to the line of vision *a b*. These, therefore, do not retire from the spectator, and will not appear to converge. But the eye is incapable of receiving at once rays of light which enter it con-

verging at a greater angle than 60°. The parallel lines, therefore, *d c*, *d′ c′*, &c., each subtend an angle of 60°; and the eye cannot see farther along them, on either side, without turning. Now, the moment the eye is turned, the lines retire from it, and, consequently, appear to converge.

Now, let *a b* be considered a base line; then the lines *b c*, *b′ c′*, &c., are perpendiculars; but they are subject to the same laws as they were before; and, consequently, as long as they subtend an angle less than 60°, they will not converge; but the moment the eye has to turn and look up, convergence will commence.

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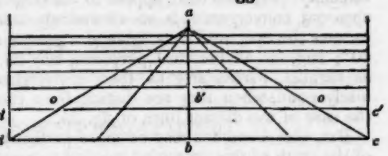

So much for theory. Now, Candidus asks why perpendiculars never appear, in fact, to converge. Let him consider that we seldom contemplate any building at a less distance than 40 yards. Before its perpendicular lines, therefore, will converge, they must be 200 ft. high; if we stand within 20 yards, more than 100 ft., &c. And, to satisfy himself that perpendiculars which subtend a greater angle than 60° do, in fact, appear to converge; let him go to the bottom of the monument, stand 12 yards from its base, and look up; and then let him talk about the non-convergence of perpendiculars, if he can.

Hence, it appears that perpendiculars do not, in general, appear to converge, because they are always at right angles to the direction in which the spectator is looking; and they never can be represented as converging, because no picture may subtend a greater angle than 60°, either in breadth or height. Take, for instance, the annexed rude perspective outline of a cathedral nave (*fig.* 36.).

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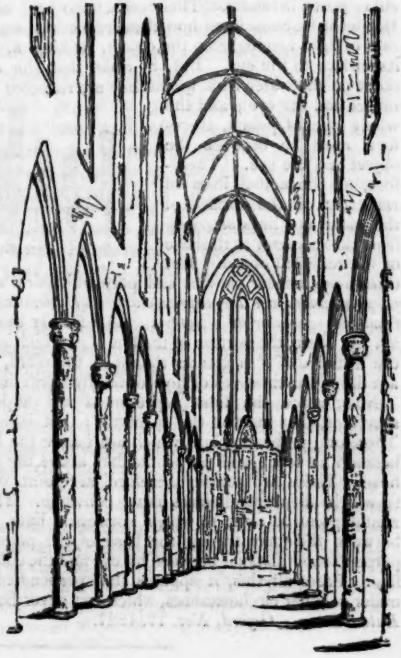
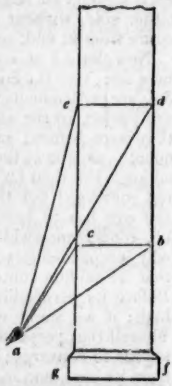


The height is 100 ft.; the distance between the columns, 20 ft.; consequently, the angular elevation of the roof, between the two nearest columns, is greater than 60°. The head would be turned upwards in looking at it; and it consequently cannot be represented in the drawing, whose upper limit, therefore, must cut off the roof between the second and third column.

Secondly, Let it not be supposed that I mean to say that perpendiculars, being right lines, are to be represented by lines which are first parallel, and then converging. Let us go back to *fig.* 35. Here, as the line *d c* subtends an angle of 60°, our distance from its central point *b* (supposing *d c* to be 100) is 90 feet, or yards, or anything. But our distance from *c* or *d* is the length of the line, or 100. Now, a near line or space, in whatever direction distance is measured, must always appear greater than one

more remote. Therefore, the space *b b′*, from which we are distant 90 ft., appears greater than the space *c c′*, from which we are distant 100 ft. Therefore, the parallel lines *b c*, *b′ c′*, &c., appear to converge. Similarly, perpendiculars appear to converge; but their apparent convergence is so excessively small, that it escapes the eye, until they subtend a greater angle than 60°; and, for all practical purposes, may be considered as parallel, particularly as their convergence is infinitely small, when they are distant from the eye, as in the case of the distant lines of *fig.* 35.

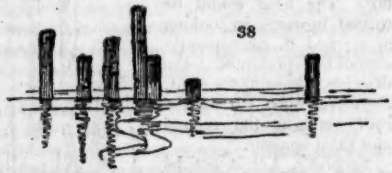
37



But, that Candidus may be more perfectly convinced of the truth of this reasoning, applied to perpendiculars, let *d e f g* in *fig.* 37. be a vertical column: let the eye of the spectator be at *a*. Now, it is evident that the diameter of the column *e d* is at a greater distance from *a* than the diameter *c b*; consequently, angle *b a c* is greater than angle *d a e*: therefore, the diameter *c b*, which the eye measures by means of the angle *b a c*, appears greater than the diameter *e d*, which is measured by the angle *d a e*; and, consequently, the perpendiculars *g e*, *f d*, appear to converge. But, if *a* be removed to any moderate distance from the column, the difference between the angles will be so excessively small, that the convergence is unperceived, and, in practice, ought to be unexpressed.

Thirdly, I have hitherto referred perpendiculars to vertical vanishing points; but, by considering them as the representatives of horizontal lines, they may be referred to vanishing points on the horizon. Let *fig.* 38. be a few perpendicular posts in water. Their reflections are, of course, also perpendicular. But let it be considered how these reflections are formed: they are formed by rays of light coming from the object, striking on the water, and reflected from its surface to the eye. But, in order that the rays may meet the eye, the point on the water from which they are reflected must be directly between the object and the eye; and the whole line of points, therefore, must be between the object and the eye. Therefore, all the actual lines of reflection on the surface of the water are lines *diverging* from the spectator to the base of the reflected object. But those lines appear parallel and perpendicular; whence, it is evident that *all perpendiculars are the representatives of lines on a horizontal surface, diverging from the spectator as a centre.* As a farther example of this, let us return to *fig.* 35. Here, the portion of the line *d′ c′*, which is equal to *d c*, is *o o*; therefore, the distance *d′ c′* is greater than *d c*; therefore, the perpendiculars *d d′*, *c c′*, are the representatives of horizontal divergent lines.

38



Now, since the lines represented by perpendiculars diverge *from* the spectator, they meet at the spectator; that is, in a point beneath, in his feet. Therefore, perpendiculars which are below the horizon converge to a point beneath his feet; and perpendiculars above the horizon, to a point above his head. These two points, therefore, are points of sight on a vertical horizon, to which all perpendiculars must converge. They correspond to the horizontal point of sight to which horizontal lines converge; and the distance between the spectator and the base of the perpendicular corresponds to the perpendicular distance between his eye and the commencement of the horizontal line. From all this, it appears that perpendiculars only appear to converge under peculiar circumstances, which can never be represented in a drawing.—*Kata Phusin. Oxford, Nov.* 17. 1837.